

Mexican Wolf Reintroduction Project
Interagency Field Team Annual Report
Reporting Period: January 1 – December 31, 2001
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Prepared by:

Arizona Game and Fish Department and U.S. Fish and Wildlife Service

Cooperators:

U.S. Fish and Wildlife Service (USFWS)
Arizona Game and Fish Department (AGFD)
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USDA Wildlife Service (USDA-WS)
US Forest Service (USFS)
White Mountain Apache Tribe (WMAT)
Turner Endangered Species Fund (TESF)
Defenders of Wildlife (DOW)

Introduction

Herein we report the progress of field efforts during 2001 to reestablish Mexican wolves (*Canis lupus baileyi*) into the Blue Range Wolf Recovery Area (BRWRA), (Fig. 1). In 2000, the White Mountain Apache Tribe (WMAT) agreed to allow wolves to inhabit reservation lands, the Fort Apache Indian reservation (FAIR), adding approximately 2,440 square miles (mi²) to the recovery area. The recovery area encompasses 9,290 mi² of the eastern portion of the Apache-Sitgreaves National Forests (A-SNF) in east-central Arizona and the Gila National Forest (GNF) in west-central New Mexico. The primary goal of the reintroduction effort is to restore a self-sustaining population of about 100 wild Mexican wolves distributed across the BRWRA. In January 1998, the first Mexican wolves were released into the Alpine District of the A-SNF of Arizona. At the end of 2001, approximately 26 wolves in 6 packs inhabited areas of both Arizona and New Mexico. In addition, there were a few other wolves whose status was considered unknown because their deaths or free-ranging existence could not be documented.

Abbreviations used in this document:

Wolf age and sex:

A = alpha
M = adult male (> 2 years old)
F = adult female (> 2 years old)
m = subadult male (1-2 years old)
f = subadult female (1-2 years old)
mp = male pup (< 1 year old)
fp = female pup (< 1 year old)

Methods

The following methods section is primarily taken from previous Mexican wolf annual reports (USFWS Mexican Wolf Annual Reports 1998-2000). For the purposes of this project, “releases” are defined as wolves being released directly from captivity, with no previous free-ranging experience, into the Primary Recovery Zone. “Translocations” are defined as a project activity where free-ranging wolves are trapped and moved to an area outside of their traditional home range. This includes wolves that have been temporarily placed in captivity after they have been free-ranging. All other management actions that include transporting a wolf to another location within its established home range is defined simply as a “movement”.

Release candidate wolves were acclimated prior to release in USFWS approved facilities where contact between wolves and humans was minimized and carcasses of road-killed native prey species (mostly deer and elk) supplemented their routine diet of processed canine food. These included the Ladder Ranch Captive Management Facility managed by the TESH (Ladder Ranch), the Sevilleta Captive Management Facility managed by the USFWS at Sevilleta National Wildlife Refuge (Sevilleta), and the Wolf Haven Captive Management Facility managed by Wolf Haven International (Wolf Haven), (see Appendix B). Sevilleta and the Ladder Ranch are in New Mexico and the Wolf Haven facility is in northwestern Washington. Genetically and socially compatible breeding pairs were established and evaluated for physical, reproductive, and behavioral suitability for direct releases into the wild. Some pairs produced pups in captivity before release, and their pups and occasionally yearlings were included in the release group.

Wolves selected for release were radio-collared and given complete physical examinations prior to being moved to the release locations. Caretaker camps were established approximately 0.5 miles away from pen sites. Carcasses of native prey and fresh water were provided as needed. When necessary, security was maintained by posted USFS closures of areas within approximately 0.5 mi of each pen.

Releases in 2001, utilized both a chain link (0.5 acres) and mesh acclimation pen (0.33 acres) at the Engineer Springs and Bear Wallow sites, respectively (Fig. 2). Since wolves were held in the acclimation pens for a period prior to release, this was considered a “soft release”. The translocation of a pack that occurred at Wildcat Point (Fig. 2) involved a “hard release”, with wolves being released straight out of a portable kennel.

All wolves were provided with supplemental road-killed elk and deer, or occasionally commercially produced “meat logs” for wild carnivores after release. The duration of supplemental feeding varied, depending on time of year, availability of vulnerable prey, and whether pups were present. Supplemental feeding was gradually discontinued when wolves began killing prey.

Monitoring was most intensive during the initial weeks after release to determine when wolves began hunting. Wolves were monitored using standard radio telemetry techniques from the ground and once or twice weekly from the air. Visual observations and fresh sign were also noted. Location data were entered into the project’s Access database for analysis.

Range maps in this document were generated using ArcView software, based on aerial telemetry locations. Home range sizes and locations were displayed using 2 different methods. Minimum convex polygons were generated based on 95% of all aerial locations with a “buffer” of either 3 or 5 miles, depending upon the number of locations used, either < 20 or ≥ 20 , respectively. This method was based on the definition of occupied wolf range in the Federal rule for the nonessential experimental Mexican wolf population. In addition, all locations of wolves were plotted with a 3- or 5-mile buffer depending on the number of locations gathered for each wolf. This figure also included non-territorial dispersing wolves. The maps are intended to describe the range and movements of wolves after release, and in some cases, movements in response to management actions or other significant events, such as the death of a mate. They are not intended as formal analysis of home range size.

Project personnel investigated wolf killed ungulates as they were found, analyzing the carcasses to determine sex, age, health, and whether or not the carcass was scavenged or was an actual wolf kill. Suspected wolf depredations on livestock were investigated by USDA-WS wolf specialists as soon as the reports were received, most often within 24-hrs. Results of all investigations were reported to the cooperators and to DOW, a non-profit organization that compensates livestock owners for depredations when wolves are probably involved. Unfortunately, not all wolf-killed livestock are found in time to document the wolves' involvement. Thus, depredation levels in this report represent the minimum number of livestock killed by wolves.

If wolves localized near areas of human activity or were found feeding on cattle they were hazed by chasing on foot, horseback, or all-terrain vehicles. When necessary, rubber bullets, cracker shells, radio-activated guard (RAG) boxes and other pyrotechnics were used to encourage a flight response to humans and discourage the nuisance behavior that the wolves were displaying. Under circumstances where wolves were not responding to aversive conditioning attempts, animals were captured and either removed from the wild or translocated into other areas within the recovery area. Capturing primarily occurs through the use of leghold traps, however occasionally conditions require the use of helicopters. In addition, the capturing of wolves is a necessary management action that occurs annually to enhance the project's monitoring capabilities, as well as remove wolves that have localized outside of the BRWRA. Monitoring is enhanced by increasing the number of radio-collared wolves, identifying and marking unknown wolves, and inspecting the health and condition of wolves in the wild.

Project personnel conducted outreach activities on a regular basis, as a means of disseminating information from the field team to stakeholders, concerned citizens, and government and non-government organizations. This is facilitated through bi-weekly updates, field contacts, handouts, informational display booths and formal presentations.

Information from the Fort Apache Indian Reservation (FAIR) was not included in this report in accordance with an agreement with the WMAT.

Results

Population status

At the end of 2001, there were 18 radio-collared wolves and approximately 8 un-collared wolves free ranging within the BRWRA, documented through telemetry, visual observations, and other evidence (Table 1). The population consisted of 6 packs (5 in Arizona and 1 in New Mexico) and 3 dispersing wolves. In addition there were a few other wolves whose status was considered unknown because their deaths or free-ranging existence could not be documented.

In 2001, project personnel documented the 2nd consecutive year of wild conceived and wild born litters. The Francisco and Cienega packs produced at least 2 pups per pack, however only 3 were known to survive into 2002 (Table 1). Project personnel documented pups in the Saddle and Wildcat packs, but no pups were thought to have been recruited into the following year's population.

Natural pack formation by free-ranging wolves occurred again in 2001. Hawk's Nest pack M674, a wild born pup from 2000, bonded with Francisco pack F587 going into the 2002 breeding season.

Table 1. Mexican wolf population estimates as of December 31, 2001.

Pack	Wolf ID	Recruitment^a	Number of Collared Wolves	Min. Pack Size^b
Hawk's Nest	AF486, AM619	0	2	2
Cienega	AM194, AF487, F621	1	3	5
Francisco	AF511, AM509, f644	2	3	8 (uncollared pups from 2000 and 2001)
Bonito Creek	AF587, AM674	0	2	2
Pipestem	AM190, F628	0	2	3 (1 uncollared pup from 2000)
Saddle	AF510, AM574, f646, m647*	0	4	4
Lupine	M632* (Fate unknown; mp678, fp679, mp680)	0	1	1
Wildcat	M578*	0	1	1
Totals		3	18	27

^a Recruitment - number of pups documented to survive through their 1st year

^b Min. Pack Size – total number of wolves (collared, uncollared, pups) documented at Year-end

*Disperser – wolves traveling primarily apart from their pack of origin

Releases and Translocations

In 2001, 2 wolf packs were released and 5 wolves were translocated into the Primary Recovery Zone, in the A-SNF of Arizona (Fig. 1 and Fig 2). On June 19, 2001 the Lupine pack was transferred into the mesh enclosure at Bear Wallow Creek and on June 20, 2001 the pack released themselves. On July 3, 2001 the Saddle pack was transferred into the chain link Engineer Springs pen and was subsequently released by project personnel on July 11, 2001 (Table 2). The release was stimulated by the close proximity of other wolves to the enclosure, in an attempt to avoid conflicts.

On March 17, 2001, the Wildcat pack was hard released from captivity back into the wild at the Centerfire Creek site (Table 3). The pack consisted of M580, AM578, and AF624. The 2 males were siblings and F624 was bonded with M578. AM578 had bred AF624 in captivity and AF624 was pregnant when released. Shortly after their hard release all pack members dispersed with AF624 eventually denning and producing at least 2 pups in New Mexico. In addition, 3 other translocations occurred involving wolves that had localized outside of the BRWRA or due to nuisance behavior (Table 3).

Table 2. Mexican wolves released from captivity without any prior history in the wild during January 1- December 31, 2001.

Pack	Wolf	Release Site	Release Date	Acclimation Facility
Saddle	AM574, AF510, fp645, fp646, mp647, mp648	Engineer Springs, AZ	01/11/2001	Sevilleta
Lupine	AM480, AF169, m630, m631, m632, f634, mp678, fp679, mp680	Bear Wallow Crk, AZ	06/19/2001	Sevilleta

Table 3. Mexican wolves translocated from captivity or the wild during January 1 – December 31, 2001.

Pack	Wolf	Release Site	Date	Reason for Translocation
Wildcat	AM578, M580, AF624 (pregnant)	Centerfire Creek, AZ	03/17/2001	Stimulate population growth in northern portion of primary zone in Arizona.
Wildcat	AM578	Fish Bench, AZ	11/10/2001	Helicopter capture outside of the BRWRA on the Ladder Ranch, NM; transported into an area with potential female mates
Saddle	m648	Northwest of Big Lake, AZ	05/02/2001	Captured out of the BRWRA on the San Carlos Reservation, AZ; transported into an area with potential female mates
Lupine	m631	Bear Wallow, AZ	07/27/01	Proximity to cattle; possible nuisance behavior; transported into an area with potential female mates and away from cattle

Mortality

Since 1998 there have been 21 wolf mortalities documented, 9 of which occurred in 2001 (Fig. 4). However, this should be considered a minimum estimate of mortalities since pups and uncollared wolves can die and not be documented by project personnel. The majority of mortalities in 2001 were human caused (Table 4), similar to previous years.

The naturally caused death of Lupine AM480 may have led to the break-up of the Lupine pack. Prior to the alpha male's death, 2 yearlings had left the area and after the male's death the rest of the pack dispersed. Five of 6 radio-collared wolves in the Lupine pack died within 6 months of their release and it was assumed the pups did not survive as there were no visuals or sign of them and the alpha female displayed widespread movement patterns prior to her death (Table 4).

Alpha female AF191 of the Pipestem pack also died of natural causes during 2001, significantly affecting her pack. She was not only the breeding female in the pack, but she was also pregnant at the time of her death.

Table 4. Mexican wolf mortalities documented during January 1 – December 31, 2001.

Wolf ID	Pack	Age	Date Found	Cause of Death
AF169	Lupine	7.6	11/12/2001	Illegal Shooting
AF191	Pipestem	6.0	04/23/2001	Mastitis/Toxemia
AM480	Lupine	5.2	07/08/2001	Asphyxiation, Snake Bite
M580	Wildcat (disperser)	2.6	11/10/2001	Capture Complications
m630	Lupine (disperser)	1.6	11/28/2001	Illegal Shooting
m631	Lupine (disperser)	1.4	09/03/2001	Vehicle Collision
f634	Lupine (disperser)	1.6	12/07/2001	Illegal Shooting
f645	Saddle (disperser)	1.5	11/04/2001	Illegal Shooting
fp682	Wildcat	0.1	06/08/2001	Suspected Dehydration

Home Ranges and Movements

Most wolves exhibited normal home range use except for the Lupine pack after the alpha male died, and the Wildcat pack, which was hard released in March. Home ranges were plotted for general reference with a 3-mile buffer as described in the nonessential experimental rule (Fig. 5). Home range sizes were calculated using the 95% convex polygon method and revealed a 10-fold range of sizes from 36 mi² to 368 mi² (Table 5). Known locations of the dispersing wolves were also plotted with a 5-mile buffer using aerial and ground locations (Fig. 6). For reference, territorial packs are also included.

Table 5. Home range sizes of free-ranging Mexican wolves in Arizona and New Mexico.

Pack	No. of Aerial Locations	Home Range Size (mi²)
Hawk's Nest	24	127
Cienega	82	36
Francisco	89	106
Bonito Creek	31	182
Pipestem	127	368
Saddle	70	195
Average	57	169

Wolf Predation

Predator-prey relationships involving Mexican gray wolves have not yet been intensively studied by the project. During 2000 and 2001, a dietary study was conducted by Texas Tech. University, in association with the wolf project. Scat was collected throughout the Primary Wolf Recovery Area for macroscopic and microscopic analysis to determine feeding habits. Laboratory analysis is still ongoing with only preliminary results available. Even though the results are not yet conclusive, the data reveals that wolves are feeding primarily on elk (*Cervus elaphus*). Conservative estimates reveal that 75% of the wolves diet consists of elk, an estimate that is not consistent with predictions made in the Final Environmental Impact Statement (FEIS). Initial predictions assumed that mule deer (*Odocoileus hemionus*) would be the primary prey base of wolves due to their high densities, 3-4 times greater than elk, prior to the inception of the project in 1998. However, due to reasons unrelated to wolves, deer densities within the primary recovery have dropped considerably while elk densities have increased to the point that elk now constitute the primary prey base available to wolves. Elk were also the most commonly documented wolf kills, however the number of carcasses collected was not large enough to produce any statistically significant results.

Wolf Depredation

The FEIS (1996) predicted that there would be 1-34 cattle depredations per year when the Mexican wolf population reaches the reintroduction goal of about 100 wolves. This represents < 0.05% of all cattle present on the range, which is only a fraction of the impact that other predators have on ranching within the Southwest.

During 2001 there were 7 confirmed and 5 possible depredations (Table 6). This is consistent with depredation levels predicted by the FEIS for a wolf population of this size (26 wolves). However, as stated previously, this should only be considered a minimum estimate as some depredations may go undocumented. In 2001 project personnel and USDA-WS captured and translocated 2 wolves into captivity as a result of wolves localizing on private land and their direct association with repeated depredations. DOW paid \$10,594 to livestock producers for losses due to wolves in 2001.

Table 6. Wolf depredations occurring during January 1 – December 31, 2001.

	Confirmed Depredation	Possible Depredation
Fatality	6 calves	1 cow and 3 calves
Injury	1 horse	1 cow

Management Actions

The capturing of wolves is a necessary management action that occurs annually to enhance the project's monitoring capabilities, as well as remove problem animals or wolves that have localized outside of the BRWRA, on private land or on the San Carlos Apache Reservation. These actions are authorized under the Special Rule for the Nonessential Experimental population.

In 2001, there were 7 wolves captured for monitoring purposes, 2 were radio-collared and all animals were processed and released on site. Some wolves were captured multiple times. All wolves were captured by leg-hold traps except for Bonito Creek AF587 who was net-gunned from a helicopter. In addition, there were 5 wolves removed from the population and placed in captivity (Fig. 4), 4 wolves translocated into the A-SNF and 1 wolf that died of capture myopathy during an attempted translocation (Table 7). The wolves that were removed by helicopter captures included AM166, AF592, AF624, AM578, and M580.

Table 7. Mexican wolves captured during January 1 – December 31, 2001.

Pack	Wolf ID	Capture Date	Reason for Capture
Francisco	AM509	07/25/01	Routine monitoring, released on site
Francisco	AM509	08/21/01	Routine monitoring, released on site
Francisco	AF511	07/25/01	Routine monitoring, released on site
Francisco	AF511	09/24/01	Routine monitoring, released on site
Francisco	f644	07/27/01	Routine monitoring, released on site
Saddle	AF510	07/25/01	Routine monitoring, released on site
Saddle	AM574	07/22/01	Routine monitoring, released on site
Saddle	f646	08/17/01	Routine monitoring, released on site
Bonito Creek	AF587	11/10/01	Routine monitoring, helicopter capture, released on site
Saddle	m648	04/30/01	On the SCAR; translocated into the A-SNF
Saddle	m648	05/31/01	Nuisance behavior on the FAIR; returned to captivity
Campbell Blue	AM166	06/10/01	Associated with cattle depredations; outside of BRWRA; helicopter capture; returned to captivity
Campbell Blue	AF592	06/10/01	Associated with cattle depredations; outside of BRWRA; helicopter capture; returned to captivity
Wildcat	AF624	06/10/01	Out of BRWRA; helicopter capture; returned to captivity
Wildcat	mp681	06/10/01	Out of BRWRA; returned to captivity
Lupine	m631	07/26/01	Proximity to cattle; possible nuisance behavior; translocated into A-SNF
Wildcat	AM578	11/09/01	Out of BRWRA; helicopter capture; translocated into A-SNF
Wildcat	M580	11/09/01	On the SCAR; helicopter capture; died as a result of capture
Lupine	m632	12/31/01	Out of BRWRA; feeding on cattle carcasses; translocated into A-SNF (2002)

Outreach

During 2001, project updates were posted locally approximately every 2 weeks in the wolf recovery area (Alpine, Nutrioso, and Springerville) in various places such as the US Post Offices, libraries, US Forest Service offices, and the USFWS Mexican wolf web site. Additionally, project updates were also emailed and faxed to numerous stakeholders and interested citizens.

The Mexican Wolf Interagency Reporting Hotline, 1-888-459-WOLF (9653), was maintained for citizens to report sightings, harassment, taking of Mexican wolves, or livestock depredations.

Project personnel regularly contacted campers, hunters, and other recreationists in the wolf-occupied recovery area to provide information and answer questions about the Mexican wolf project. Direct mailings were sent to 4,100 hunters who drew permits to hunt big game in the Arizona portion of the wolf recovery area. These notices advised hunters of the potential for encountering wolves, provided general recommendations for camping and hunting in wolf-occupied areas, and explained the legal provisions of the nonessential experimental population rule. Project personnel gave 39 presentations and status reports to over 2,080 people in federal and state agencies, conservation groups, rural communities, guide/outfitter organizations, livestock associations, schools, and various other public and private institutions throughout Arizona and New Mexico.

Summary

At the end of 2001, there were 18 radio-collared wolves and approximately 8 uncollared wolves free ranging within the BRWRA. The population includes 6 packs (5 in Arizona and 1 in New Mexico) and 3 dispersing wolves. There could be other undocumented wolves free-ranging whose radio-collars have failed or who were never radio-collared. However, the number of undocumented wolves is probably very small as all credible reports of wolf sightings are investigated and regular field operations has revealed no evidence of extra wolves traveling with established packs. Undocumented wolves are most likely loners, as wolf packs usually leave more sign that is easier to locate.

Since the inception of the project in 1998, there have been 21 wolf mortalities documented in the wild, 9 of which occurred in 2001. Wolves are feeding primarily on elk, which is not consistent with predictions made in the FEIS. However, during 2001 there were also 7 confirmed and 5 possible depredations. This level of depredation is consistent with predictions in the FEIS for a wolf population of this size.

In 2001, there were 7 wolves captured for monitoring purposes, 2 were radio-collared and all animals were processed and released on site. In addition, there were 5 wolves removed from the population and placed in captivity, and 4 wolves translocated into the A-SNF.

Informational direct mailings were sent to 4,100 hunters who drew permits to hunt big game in the Arizona portion of the wolf recovery area. Project personnel provided Bi-weekly updates, maintained a project web site, regularly contacted campers, hunters, and other recreationists, and gave more than 39 presentations and status reports to over 2,080 people in an attempt to keep the public, government agencies, and nongovernmental organizations informed about the program.

Discussion

Overall, progress in the field went as expected and outlined in the FEIS. Packs formed naturally on their own in the wild. Wolves conceived and gave birth to pups in the wild, some surviving through their 1st year. Natural-caused deaths of 2 alpha wolves affected productivity in 1 pack and

completely disrupted another pack. Human caused mortality was significant but did not threaten overall success. However, continued outreach, education, and two-way communication should reduce accidental shootings. Project personnel responded and resolved major conflicts with livestock and nuisance wolves. Responsive management of depredating wolves should reduce the overall amount of depredation and prevent wolves in the future from becoming habituated to livestock. Continuation of existing procedures is recommended.

Mexican Wolf Blue Range Wolf Recovery Area

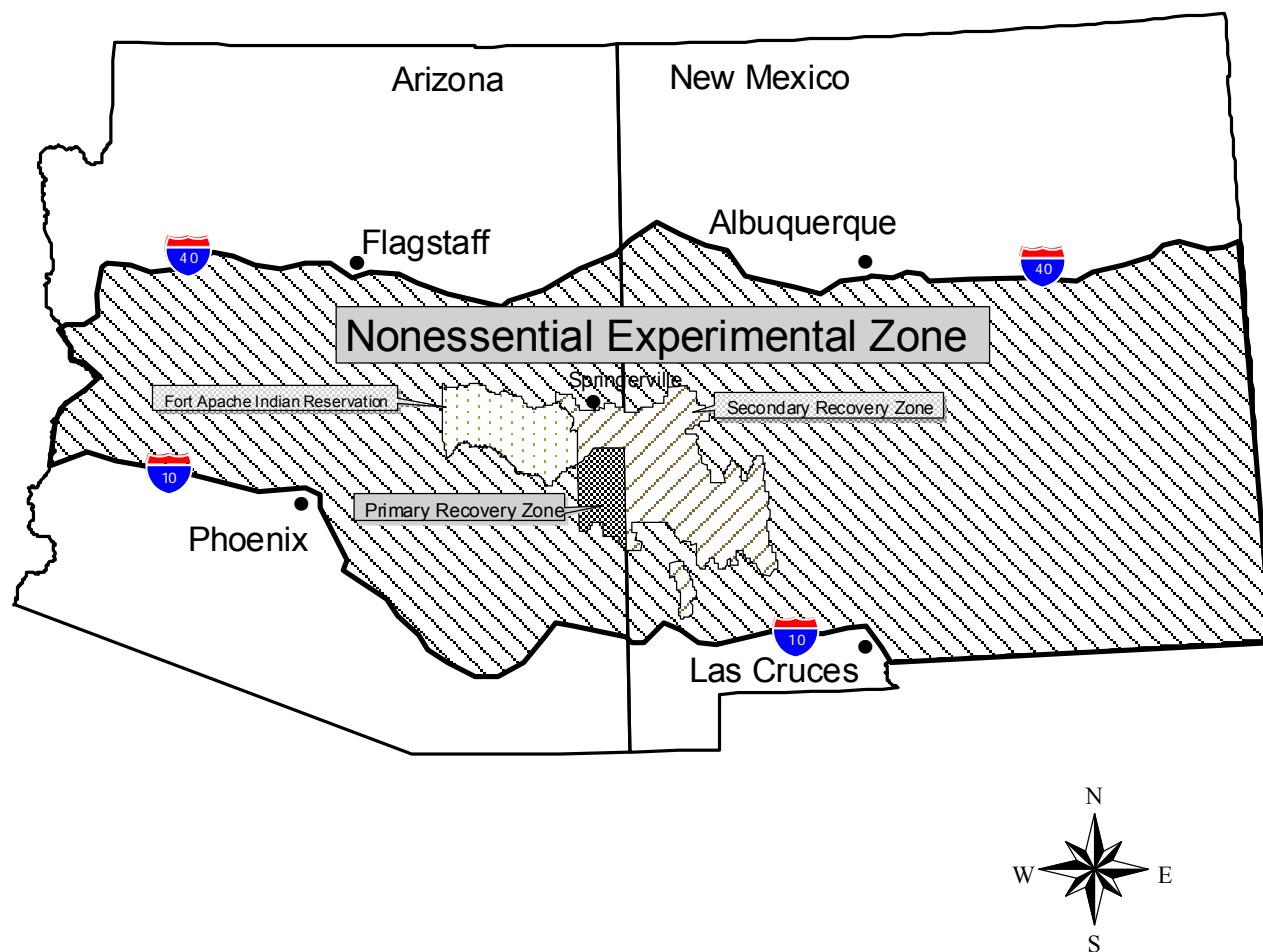


Figure 1. The Mexican Wolf Blue Range Wolf Recovery Area in Arizona and New Mexico.

2001 Release and Translocation Sites

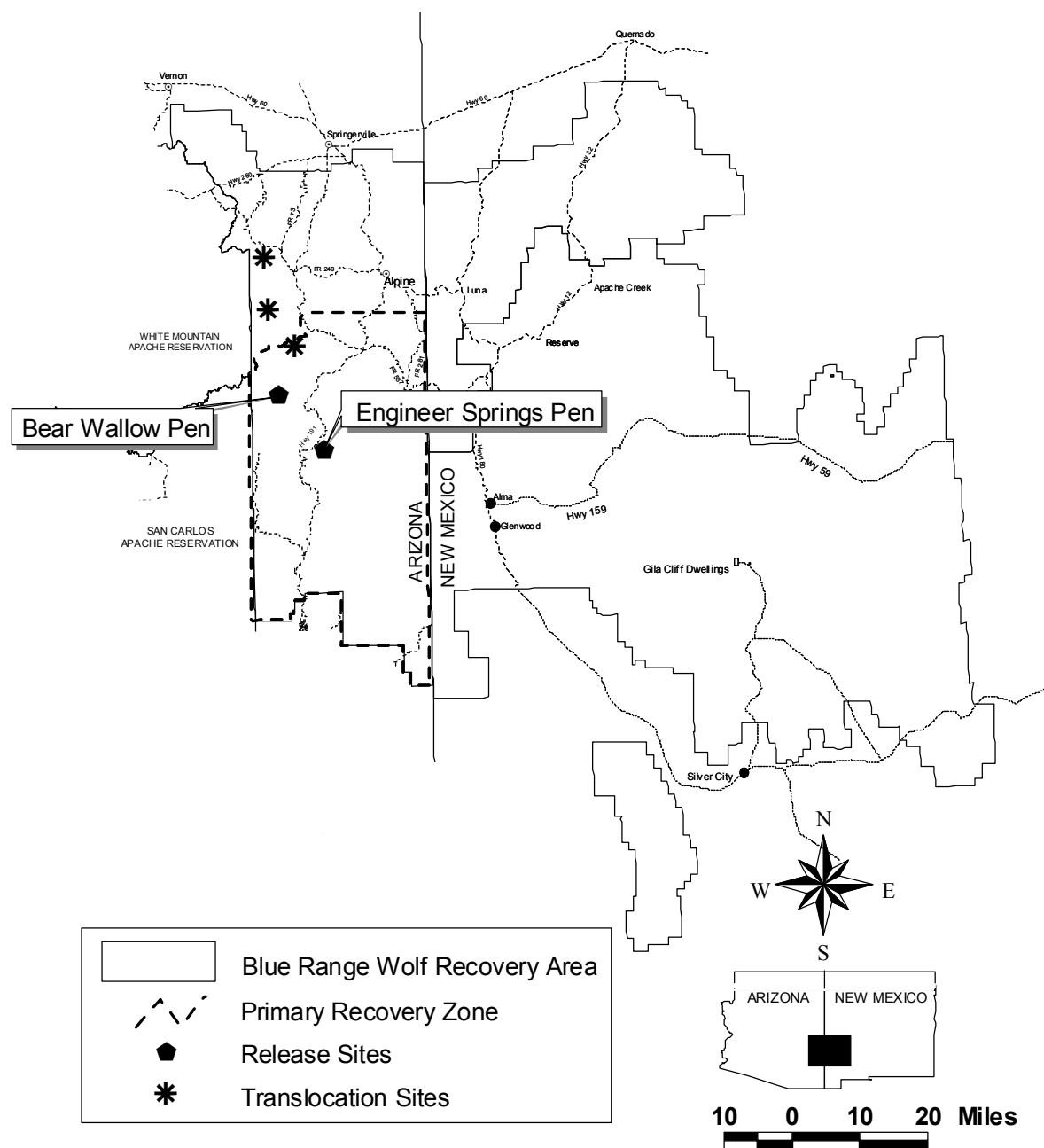


Figure 2. Release and translocation sites for Mexican wolves within the Blue Range Wolf Recovery Area in 2001.

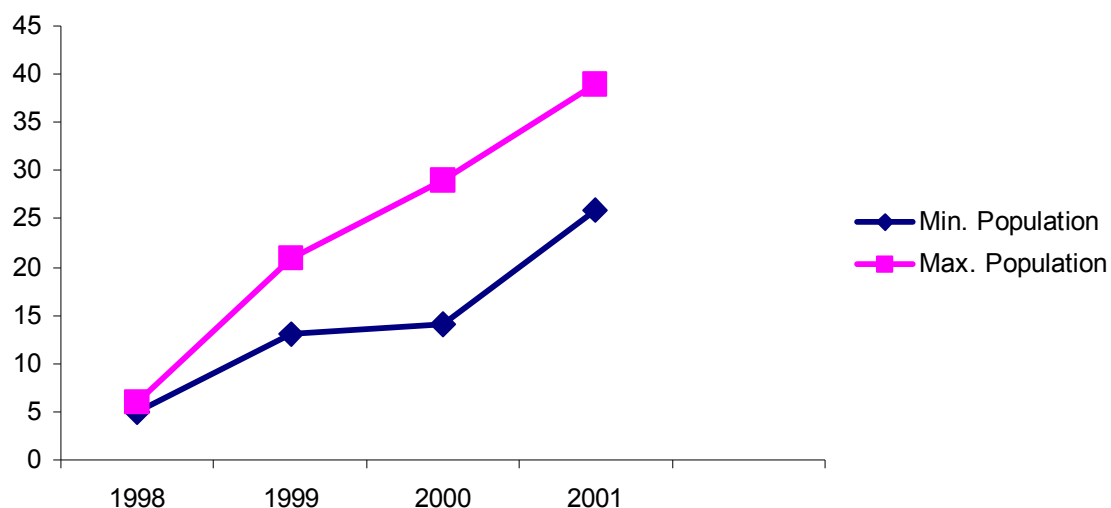


Figure 3. Mexican wolf population estimates from 1998—2001. The difference between the minimum and maximum population represents an estimate of uncollared animals.

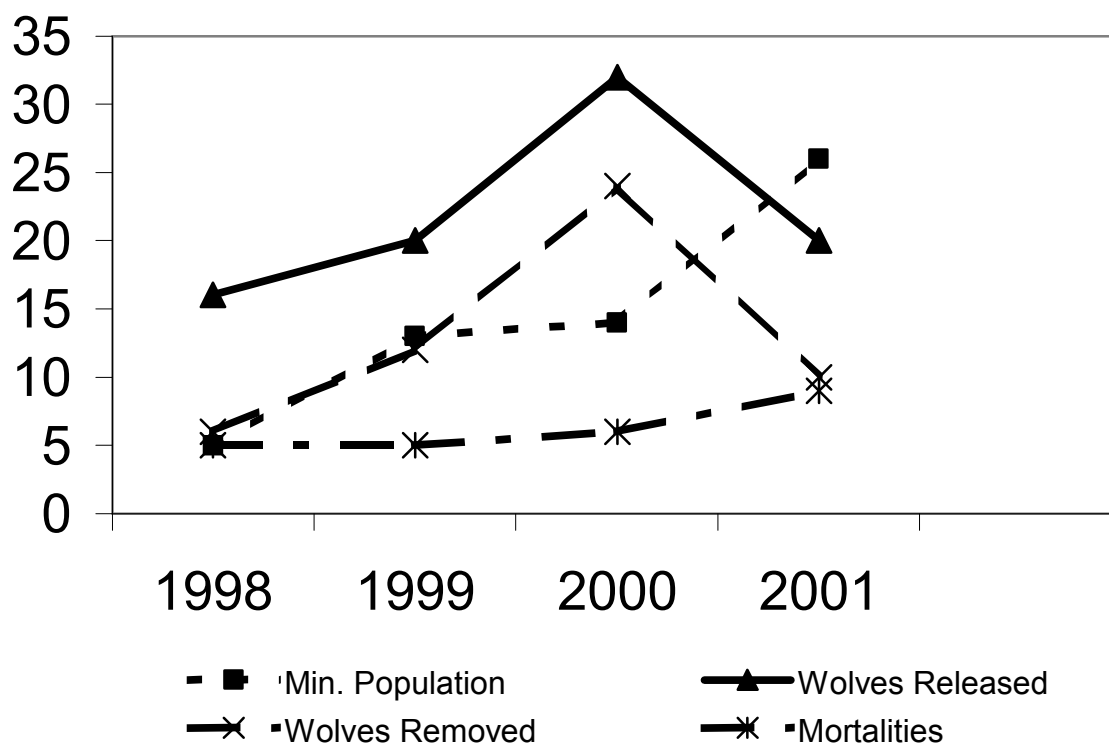


Figure 4. Mexican wolf population estimates and associated population parameters. Released wolves represents: pack translocations (wolves re-released from captivity back into the wild) and initial direct releases (wolves with no wild experience).

2001 Mexican Wolf Home Ranges

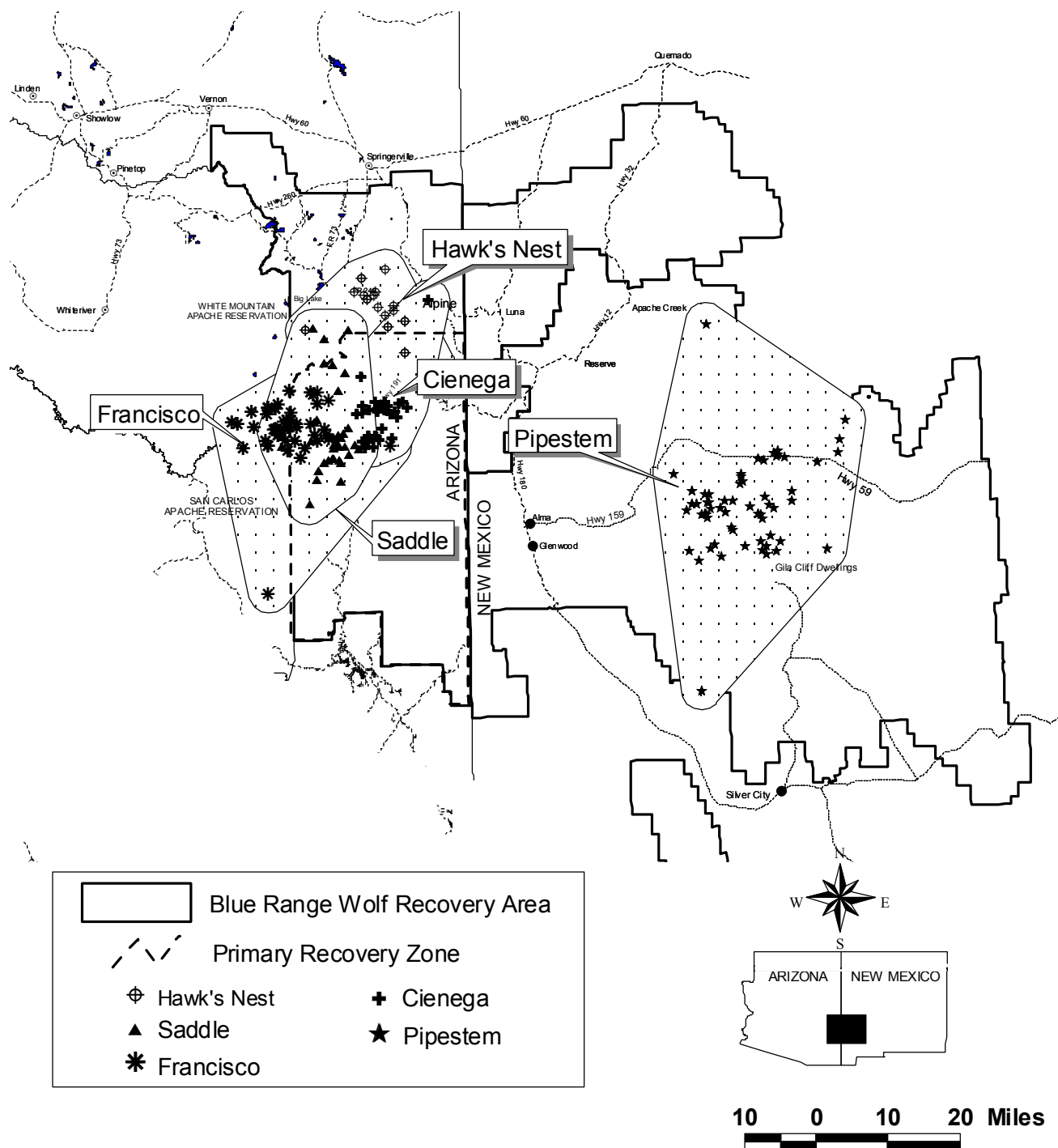


Figure 5. Mexican wolf home ranges in 2001 using the minimum convex polygon method with a 3-mile buffer added.

2001 Mexican Wolf Locations

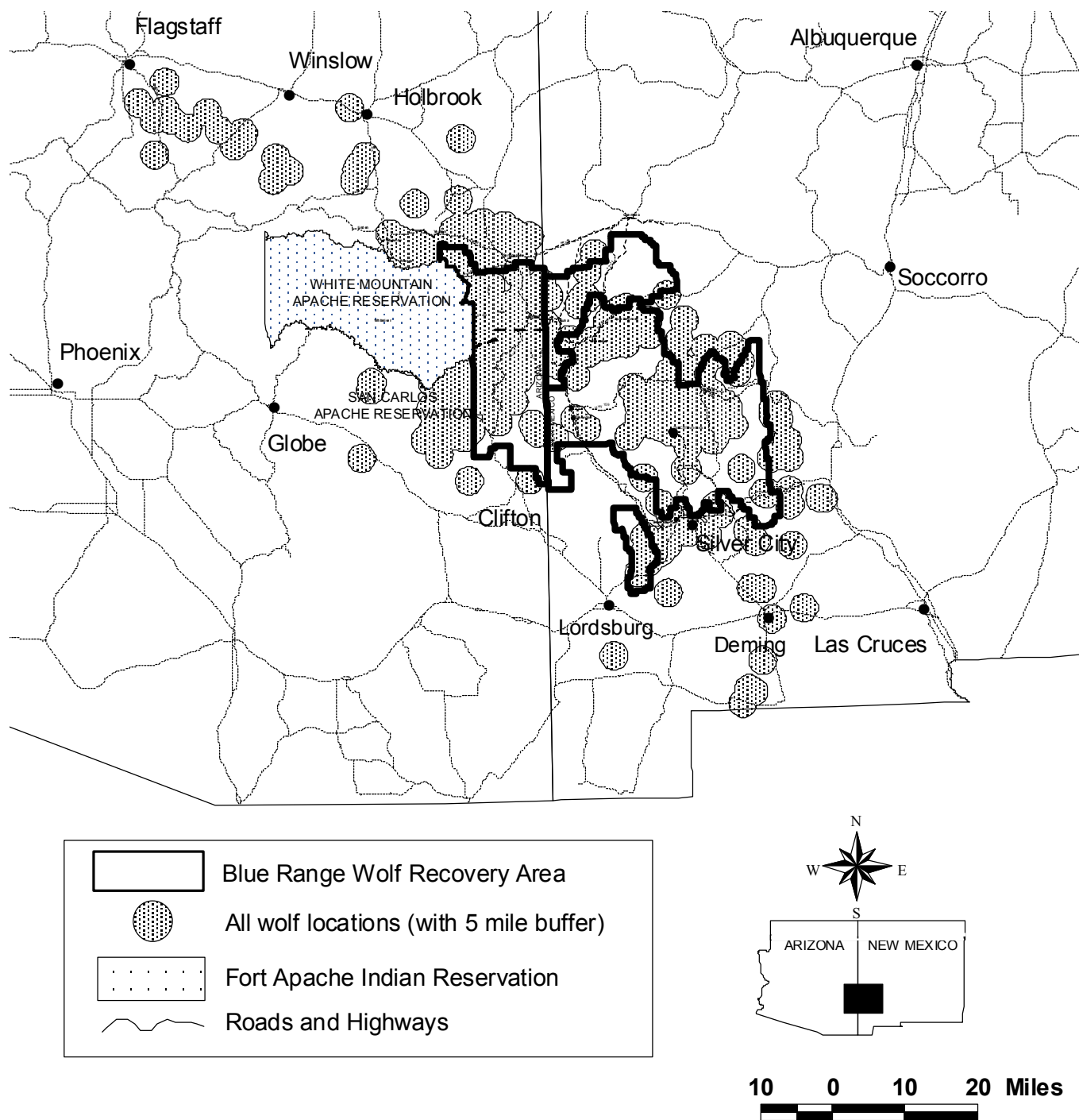


Figure 6. All Mexican wolf locations (aerial and ground) in 2001, with a 5-mile buffer added.

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APPENDIX A

Pack Summaries

Hawk's Nest (AF486, AM619)

These 2 wolves were first located together in December of 2000. The pair soon established a territory defined by the Campbell Blue River and Williams Valley near Lake Sierra Blanca. This is the same area that AM131 and AF486 had used when they were together in 1999 and 2000 prior to AM131 being euthanized. The female may have denned near Lake Sierra Blanca, but no evidence of pups was documented.

Bonito Creek (AF587, AM674)

After leaving the Hawk's Nest pack in December of 2000, M674 was located regularly with the Francisco pack in January, and in the territory of the Francisco pack through March of that year. In late April of 2001, F587 from the Francisco pack and M674 began to move north and establish a territory south and west of Reservation Lake on the White Mountain Apache Reservation. M674 was the first radio-collared wild-born wolf in the Mexican wolf reintroduction program. This natural pairing is significant because it is the first recorded pack formation from a wild born Mexican wolf.

Cienega (AM194, AF487, F621)

The Cienega pack was able to breed and raise pups in the wild for the first time in 2001. The female denned in an area near Grant Creek east of Hannagan Meadow in the Blue Range Primitive Area (BRPA). In September, IFT members observed two pups with the alpha pair. In October, an elk hunter filmed four wolves, three collared (AM194, AF487, F621) and one un-collared, walking through a meadow. F621 left the alpha pair during the breeding season in January and February and made dispersal movements east and north on three different occasions. Based on aerial telemetry flights, each of the exploratory movements lasted for approximately two weeks. After May 15, F621 traveled with the alpha pair for the remainder of the year.

Saddle (AF510, AM574, f646)

After being released in January of 2001, the pack established a territory in the area south and west of Blue Vista, on the A-SNF. Three of the four yearlings released with the pack dispersed before the end of the year (f645, m647, and m648). AF510 was believed to be denning in April, but no pups were documented to survive. There were also suspected depredations in the East Eagle Allotment where these wolves were located. Several incidents were investigated, but no depredations were confirmed.

Francisco (AM509, AF511, f644)

The Francisco pack spent most of the winter months in the country below the Mogollon Rim, between Baldy Bill Point and Malay Gap. The female denned in the area of Malay Gap. In the early summer the wolves in this pack moved above the rim in the area of the Bear Wallow Wilderness. Monitoring revealed that there were eight wolves in this pack indicating that four pups had survived from 2000 and two pups from 2001. On July 27, f644 was trapped and radio-

collared. The pack continued to use the upper country until late November, before moving back down below the Rim.

Lupine (AF169, AM480, m630, m631, m632, f634, fp678, mp679, mp680)

Soon after their release in 2001, sub-adult members (m630, m631, m632, m634) of the Lupine pack dispersed. The alpha pair was localized near the release site for about the first month. On July 9, AM480 was found dead from asphyxiation induced by snakebite in the Bear Wallow wilderness. AF169 continued to use this area for most of the summer and supplemental feeding continued in order to help support the pups released with the pack. In the fall, AF169 began to expand her movements to the north and west. On November 15, she was found dead from gunshot on the White Mountain Apache Reservation (WMAT). The fates of the pups released with this pack are unknown.

Pipestem Pack (AF191, AM190, F628)

During the winter the Pipestem pack was located between Snow Lake and Black Mountain along the north end of the Gila Wilderness, an area with high elk density. In early January, four sets of tracks were observed indicating that one pup from 2000 was traveling with the collared wolves. This was the last observation or sign of a fourth wolf. On April 25, AF191 was found dead south of Loco Mountain in the Gila Wilderness. The necropsy showed that she died of an infected uterus in association with pregnancy. AM190 and F628 continued to use the Snow Lake to Black Mountain area but made several trips farther south in the Gila Wilderness. In May, the pair was suspected in the depredation of a domestic calf. In June, the pair began using the Cooney Prairie, Canyon Creek Mountain to East Elk Mountain area, slightly north of their previously documented locations. They continued to use this area through the end of the year.

Campbell Blue (AF592, AM166)

The Campbell Blue pair was captured at the request of the San Carlos Apache Tribe in late August of 2000. On December 5, 2000, the pair was hard released in Tom Moore Canyon on the east central side of the Gila Wilderness. In late December, the pair traveled onto private lands within the re-introduction area. AF592 localized in the vicinity of ranch buildings but AM166 moved away. In early January, AM166 left the area and traveled back to his old territory in Arizona. Attempts to re-capture AF592 were unsuccessful and during January, she began making regular long distance movements.

In late April of 2001, AF592 was involved in two domestic calf depredations near Canyon Creek. AM166 returned from Arizona and during late May, reunited with AF592. The pair localized on private lands outside the re-introduction area and began to prey on domestic calves. On June 10, the pair was re-captured and returned to captivity.

Individual Wolf Summaries

AF624

F624 was hard released pregnant in the Centerfire/Boggy Creek area of Arizona on March 17, 2001, with M580 and AM578. The two males were siblings and AM578 was pair-bonded to AF624. In April, AF624 traveled to New Mexico and denned on private land within the reintroduction area. A visit to the den site on June 2 revealed two pups. AF624 then relocated approximately one and a half miles from the former den but still on private land. AF624 was recaptured on June 10, in an attempt to relocate her and her pups to an area with fewer cattle. One pup was found dead and one was severely malnourished and dehydrated. They were returned to captivity for treatment.

AM578

AM578 was hard released in the Centerfire/Boggy Creek area of Arizona on March 17, 2001, with AF624 and M580. Although AM578 appeared to follow AF624 to New Mexico, there is no documentation of them being together. AM578's signal was lost after he moved into New Mexico. In July, he was located south of the re-introduction area near Cooke's Peak, New Mexico. AM578 traveled south, crossing Interstate 10 and continued to the US – Mexico border near Columbus, New Mexico. Attempts were made to trap him on several occasions outside the experimental population boundary. This wolf then traveled north and localized in the vicinity of the Phelps Dodge Tyrone Copper Mine. At the request of the Phelps Dodge Company, attempts were made to capture AM578. He then traveled south towards Lordsburg, New Mexico then moved east to Rio Grande Valley. On November 9, AM578 was captured on private land and was relocated to Arizona northeast of Hannagan Meadow. He then traveled northeast towards Apache Creek, New Mexico.

M580

M580 was hard released in the Centerfire/Boggy Creek area of Arizona on March 17, 2001, with AF624 and AM578. M580 appeared to make movements in the general area of the release site, as well as, forays onto the San Carlos and White Mountain reservations, for several months after the initial release. He continued to range widely across the recovery area in a manner consistent of a lone wolf until November; upon the request of the San Carlos Apache Tribe, an attempt was made to remove M580 from tribal land. Although he was captured and removed with a helicopter on November 9, 2001, M580 died the next day due to capture myopathy.

m630

m630 was released as a yearling on June 20, 2001, with the Lupine Pack in the Bear Wallow Wilderness of Arizona. He dispersed north through the BRWRA. On December 3, m630 was found dead from a gunshot north of Greens Peak in Arizona.

m631

m631 was released as a yearling on June 20, 2001, with the Lupine Pack in the Bear Wallow Wilderness of Arizona. He dispersed to New Mexico and was captured near Apache Creek, New Mexico; he was released back in the Bear Wallow Wilderness in the A-SNF. He returned to the area near Apache Creek and was found dead on September 4, from a vehicle collision.

m632

m632 was released as a yearling on June 20, 2001, with the Lupine Pack in the Bear Wallow Wilderness of Arizona. He dispersed north and east and was located on private land outside the BRWRA feeding on dead livestock. At the request of the landowner, m632 was captured on December 31, near the San Augustine Plains, in New Mexico. He was transferred to the Engineer Springs release pen and held there until his release in January, 2002.

f634

f634 was released as a yearling on June 20, 2001, with the Lupine Pack in the Bear Wallow Wilderness of Arizona. She dispersed to the northwest and disappeared. She was found dead on December 7, 2001, from a gunshot near Woods Canyon Lake, in Arizona. She had been dead for several months.

f645

f645 was originally released as a member of the Saddle pack in Arizona on January 11, 2001. However, in March, f645 and two siblings (m647, m648) moved away from the pack onto San Carlos Tribal land. f645 returned to the Saddle pack, while her two siblings dispersed (see below). In early July, f645 moved into the area south of Highway 260 on the White Mountain Apache Reservation. However, she eventually rejoined the Saddle pack one month later. f645 continued with this nomadic behavior in early October when she moved into the Greens Peak area. She remained in this area until November 5, 2001, when she was found dead from a gunshot.

m647

m647 was originally released as a member of the Saddle pack in Arizona on January 11, 2001. However, in March, m647 and 2 siblings (f645, m648) moved away from the pack onto San Carlos Tribal land. m647 dispersed north onto the White Mountain Apache Reservation and eventually moved north towards Highway 260. He then moved several miles north of Springerville, followed by dispersal into an area near Vernon, where he remained until July, 2001. His movements in July are not known. m647 was documented again in August northwest of Snowflake, Arizona around Chevelon Lake. In October, m647 moved to the east and spent time in the area around Mormon Lake. Near the end of the reporting period he moved back towards Show Low, near Wishbone Mountain.

m648

m648 was originally released as a member of the Saddle pack in Arizona on January 11, 2001. However, in March, m648 and 2 siblings (f645, m647) moved away from the pack onto San Carlos Tribal land. Although the other wolves eventually left the San Carlos Apache Reservation (SCAR), m648 remained in the area and was removed on May 2 and relocated to the Big Lake area, in Arizona. Nuisance behavior by this wolf was documented resulting in his capture on May 31, 2001; he was returned to captivity.

APPENDIX B

Captive Management

The captive Mexican gray wolf population is managed for the Service under the American Zoological and Aquarium Association's Mexican Wolf Species Survival Plan program (SSP). In 2001, there were approximately 205 wolves in captivity in over 40 facilities in the United States and Mexico. One of the primary goals of the SSP captive breeding program is to provide wolves for the Service for reintroduction purposes. Captive wolves are selected for release based on their genetic makeup, reproductive performance, behavioral criteria, physical suitability, and response to the adaptation process. All wolves selected for release are genetically redundant to the captive population (i.e. their genes are already well-represented) to minimize any adverse effects on genetic integrity of the remaining captive population, in case they expire in the wild.

Release candidate Mexican gray wolves are acclimated prior to release in Service-approved facilities designed to house wolves in a manner that fosters wild characteristics and behaviors. They include the Sevilleta Wolf Management Facility, the Ladder Ranch Wolf Management Facility, and Wolf Haven International (described below). Wolves at these facilities are managed in a manner that minimizes human contact in order to promote the development of wolf behaviors such as pair bonding, breeding, pup rearing, and pack structure development. More importantly, limiting the wolves' exposure to humans also serves to promote avoidance behavior.

Release candidate Mexican gray wolves are sustained on a zoo-based diet of carnivore logs and a kibble diet formulized for wild canids. Additionally, carcasses of road-killed native ungulate species, such as deer and elk, are supplemented when available to mimic prey items the wolves would encounter in the wild. Wolves held at pre-release facilities are examined annually to vaccinate for canine diseases and to evaluate overall health conditions, and are treated for other veterinary purposes on an as-needed basis.

Sevilleta Wolf Management Facility (SWMF)

The SWMF is located on the Sevilleta National Wildlife Refuge near Socorro, New Mexico. There are a total of seven enclosures, ranging in size from $\frac{1}{4}$ of an acre to approximately $1\frac{1}{4}$ acre, plus an additional quarantine pen.

Ladder Ranch Wolf Management Facility (LRWMF)

The LRWMF is located on the Ladder Ranch near Truth or Consequences, New Mexico. There are a total of five enclosures, ranging in size from $\frac{1}{4}$ acre to 1 acre.

Wolf Haven International (WHI)

WHI is located in Tenino, Washington. There are a total of two enclosures at the facility for housing Mexican wolves, each just over $\frac{1}{2}$ acre in size.

APPENDIX C

Personnel

The following personnel were involved in the project during this reporting period. Individuals listed below collected data or provided other information for this report.

U.S. Fish and Wildlife Service

Brian Kelly, Mexican Wolf Recovery Coordinator
Wendy Brown, Mexican Wolf Field Coordinator (until May 2001)
Colleen Buchanan, Mexican Wolf Captive Management Biologist
Dan Stark, Mexican Wolf Biologist
Maggie Dwire, Biological Technician (Apr-May 2001); Mexican Wolf Biologist (Nov 2001)

Michelle Brown, Outreach Coordinator (until September, 2001)
Theresa Oleksiew, Office Assistant
Vanessa Sanchez, Student Cooperative Education Program

Arizona Game and Fish Department

Dan Groebner, Regional Nongame Specialist and AGDF Wolf Project Leader
Stephanie Naftal, Field Team Leader (until Nov 2001)
Alexis Watts, Wolf Technician (until Sep 2001)
Paul Overy, Wolf Technician (after Aug 2001)

New Mexico Department of Game and Fish

Nick Smith, Wolf Biologist

USDA-APHIS Wildlife Services

Alan Armistead, Wolf Management Specialist

Turner Endangered Species Fund

Melissa Woolf, Mexican Wolf Biologist

White Mountain Apache Tribe

Krista Beazley, Tribal Mexican Wolf Biologist (after Mar 2001)

Texas Tech. University

Janet Reid, Master's Student (Dietary Study)

Volunteers

Rich Bard	Brandon Barr	Melany Benoit	Anna Cellar
Cari Common	Maggie Dwire	Tamar Friedner	Jason Hawley
Ryan Hilgris	Grant Merrill	Julia Nelson	Melissa Peer

Mexican Wolf Reintroduction Project
Interagency Field Team Annual Report
Reporting Period: January 1 – December 31, 2001
November 2003

Prepared by:

Arizona Game and Fish Department and U.S. Fish and Wildlife Service

Cooperators:

U.S. Fish and Wildlife Service (USFWS)
Arizona Game and Fish Department (AGFD)
New Mexico Department of Game and Fish (NMDGF)
USDA Wildlife Service (USDA-WS)
US Forest Service (USFS)
White Mountain Apache Tribe (WMAT)
Turner Endangered Species Fund (TESF)
Defenders of Wildlife (DOW)

Introduction

Herein we report the progress of field efforts during 2001 to reestablish Mexican wolves (*Canis lupus baileyi*) into the Blue Range Wolf Recovery Area (BRWRA), (Fig. 1). In 2000, the White Mountain Apache Tribe (WMAT) agreed to allow wolves to inhabit reservation lands, the Fort Apache Indian reservation (FAIR), adding approximately 2,440 square miles (mi²) to the recovery area. The recovery area encompasses 9,290 mi² of the eastern portion of the Apache-Sitgreaves National Forests (A-SNF) in east-central Arizona and the Gila National Forest (GNF) in west-central New Mexico. The primary goal of the reintroduction effort is to restore a self-sustaining population of about 100 wild Mexican wolves distributed across the BRWRA. In January 1998, the first Mexican wolves were released into the Alpine District of the A-SNF of Arizona. At the end of 2001, approximately 26 wolves in 6 packs inhabited areas of both Arizona and New Mexico. In addition, there were a few other wolves whose status was considered unknown because their deaths or free-ranging existence could not be documented.

Abbreviations used in this document:

Wolf age and sex:

A = alpha
M = adult male (> 2 years old)
F = adult female (> 2 years old)
m = subadult male (1-2 years old)
f = subadult female (1-2 years old)
mp = male pup (< 1 year old)
fp = female pup (< 1 year old)

Methods

The following methods section is primarily taken from previous Mexican wolf annual reports (USFWS Mexican Wolf Annual Reports 1998-2000). For the purposes of this project, “releases” are defined as wolves being released directly from captivity, with no previous free-ranging experience, into the Primary Recovery Zone. “Translocations” are defined as a project activity where free-ranging wolves are trapped and moved to an area outside of their traditional home range. This includes wolves that have been temporarily placed in captivity after they have been free-ranging. All other management actions that include transporting a wolf to another location within its established home range is defined simply as a “movement”.

Release candidate wolves were acclimated prior to release in USFWS approved facilities where contact between wolves and humans was minimized and carcasses of road-killed native prey species (mostly deer and elk) supplemented their routine diet of processed canine food. These included the Ladder Ranch Captive Management Facility managed by the TESH (Ladder Ranch), the Sevilleta Captive Management Facility managed by the USFWS at Sevilleta National Wildlife Refuge (Sevilleta), and the Wolf Haven Captive Management Facility managed by Wolf Haven International (Wolf Haven), (see Appendix B). Sevilleta and the Ladder Ranch are in New Mexico and the Wolf Haven facility is in northwestern Washington. Genetically and socially compatible breeding pairs were established and evaluated for physical, reproductive, and behavioral suitability for direct releases into the wild. Some pairs produced pups in captivity before release, and their pups and occasionally yearlings were included in the release group.

Wolves selected for release were radio-collared and given complete physical examinations prior to being moved to the release locations. Caretaker camps were established approximately 0.5 miles away from pen sites. Carcasses of native prey and fresh water were provided as needed. When necessary, security was maintained by posted USFS closures of areas within approximately 0.5 mi of each pen.

Releases in 2001, utilized both a chain link (0.5 acres) and mesh acclimation pen (0.33 acres) at the Engineer Springs and Bear Wallow sites, respectively (Fig. 2). Since wolves were held in the acclimation pens for a period prior to release, this was considered a “soft release”. The translocation of a pack that occurred at Wildcat Point (Fig. 2) involved a “hard release”, with wolves being released straight out of a portable kennel.

All wolves were provided with supplemental road-killed elk and deer, or occasionally commercially produced “meat logs” for wild carnivores after release. The duration of supplemental feeding varied, depending on time of year, availability of vulnerable prey, and whether pups were present. Supplemental feeding was gradually discontinued when wolves began killing prey.

Monitoring was most intensive during the initial weeks after release to determine when wolves began hunting. Wolves were monitored using standard radio telemetry techniques from the ground and once or twice weekly from the air. Visual observations and fresh sign were also noted. Location data were entered into the project’s Access database for analysis.

Range maps in this document were generated using ArcView software, based on aerial telemetry locations. Home range sizes and locations were displayed using 2 different methods. Minimum convex polygons were generated based on 95% of all aerial locations with a “buffer” of either 3 or 5 miles, depending upon the number of locations used, either < 20 or ≥ 20 , respectively. This method was based on the definition of occupied wolf range in the Federal rule for the nonessential experimental Mexican wolf population. In addition, all locations of wolves were plotted with a 3- or 5-mile buffer depending on the number of locations gathered for each wolf. This figure also included non-territorial dispersing wolves. The maps are intended to describe the range and movements of wolves after release, and in some cases, movements in response to management actions or other significant events, such as the death of a mate. They are not intended as formal analysis of home range size.

Project personnel investigated wolf killed ungulates as they were found, analyzing the carcasses to determine sex, age, health, and whether or not the carcass was scavenged or was an actual wolf kill. Suspected wolf depredations on livestock were investigated by USDA-WS wolf specialists as soon as the reports were received, most often within 24-hrs. Results of all investigations were reported to the cooperators and to DOW, a non-profit organization that compensates livestock owners for depredations when wolves are probably involved. Unfortunately, not all wolf-killed livestock are found in time to document the wolves' involvement. Thus, depredation levels in this report represent the minimum number of livestock killed by wolves.

If wolves localized near areas of human activity or were found feeding on cattle they were hazed by chasing on foot, horseback, or all-terrain vehicles. When necessary, rubber bullets, cracker shells, radio-activated guard (RAG) boxes and other pyrotechnics were used to encourage a flight response to humans and discourage the nuisance behavior that the wolves were displaying. Under circumstances where wolves were not responding to aversive conditioning attempts, animals were captured and either removed from the wild or translocated into other areas within the recovery area. Capturing primarily occurs through the use of leghold traps, however occasionally conditions require the use of helicopters. In addition, the capturing of wolves is a necessary management action that occurs annually to enhance the project's monitoring capabilities, as well as remove wolves that have localized outside of the BRWRA. Monitoring is enhanced by increasing the number of radio-collared wolves, identifying and marking unknown wolves, and inspecting the health and condition of wolves in the wild.

Project personnel conducted outreach activities on a regular basis, as a means of disseminating information from the field team to stakeholders, concerned citizens, and government and non-government organizations. This is facilitated through bi-weekly updates, field contacts, handouts, informational display booths and formal presentations.

Information from the Fort Apache Indian Reservation (FAIR) was not included in this report in accordance with an agreement with the WMAT.

Results

Population status

At the end of 2001, there were 18 radio-collared wolves and approximately 8 un-collared wolves free ranging within the BRWRA, documented through telemetry, visual observations, and other evidence (Table 1). The population consisted of 6 packs (5 in Arizona and 1 in New Mexico) and 3 dispersing wolves. In addition there were a few other wolves whose status was considered unknown because their deaths or free-ranging existence could not be documented.

In 2001, project personnel documented the 2nd consecutive year of wild conceived and wild born litters. The Francisco and Cienega packs produced at least 2 pups per pack, however only 3 were known to survive into 2002 (Table 1). Project personnel documented pups in the Saddle and Wildcat packs, but no pups were thought to have been recruited into the following year's population.

Natural pack formation by free-ranging wolves occurred again in 2001. Hawk's Nest pack M674, a wild born pup from 2000, bonded with Francisco pack F587 going into the 2002 breeding season.

Table 1. Mexican wolf population estimates as of December 31, 2001.

Pack	Wolf ID	Recruitment^a	Number of Collared Wolves	Min. Pack Size^b
Hawk's Nest	AF486, AM619	0	2	2
Cienega	AM194, AF487, F621	1	3	5
Francisco	AF511, AM509, f644	2	3	8 (uncollared pups from 2000 and 2001)
Bonito Creek	AF587, AM674	0	2	2
Pipestem	AM190, F628	0	2	3 (1 uncollared pup from 2000)
Saddle	AF510, AM574, f646, m647*	0	4	4
Lupine	M632* (Fate unknown; mp678, fp679, mp680)	0	1	1
Wildcat	M578*	0	1	1
Totals		3	18	27

^a Recruitment - number of pups documented to survive through their 1st year

^b Min. Pack Size – total number of wolves (collared, uncollared, pups) documented at Year-end

*Disperser – wolves traveling primarily apart from their pack of origin

Releases and Translocations

In 2001, 2 wolf packs were released and 5 wolves were translocated into the Primary Recovery Zone, in the A-SNF of Arizona (Fig. 1 and Fig 2). On June 19, 2001 the Lupine pack was transferred into the mesh enclosure at Bear Wallow Creek and on June 20, 2001 the pack released themselves. On July 3, 2001 the Saddle pack was transferred into the chain link Engineer Springs pen and was subsequently released by project personnel on July 11, 2001 (Table 2). The release was stimulated by the close proximity of other wolves to the enclosure, in an attempt to avoid conflicts.

On March 17, 2001, the Wildcat pack was hard released from captivity back into the wild at the Centerfire Creek site (Table 3). The pack consisted of M580, AM578, and AF624. The 2 males were siblings and F624 was bonded with M578. AM578 had bred AF624 in captivity and AF624 was pregnant when released. Shortly after their hard release all pack members dispersed with AF624 eventually denning and producing at least 2 pups in New Mexico. In addition, 3 other translocations occurred involving wolves that had localized outside of the BRWRA or due to nuisance behavior (Table 3).

Table 2. Mexican wolves released from captivity without any prior history in the wild during January 1- December 31, 2001.

Pack	Wolf	Release Site	Release Date	Acclimation Facility
Saddle	AM574, AF510, fp645, fp646, mp647, mp648	Engineer Springs, AZ	01/11/2001	Sevilleta
Lupine	AM480, AF169, m630, m631, m632, f634, mp678, fp679, mp680	Bear Wallow Crk, AZ	06/19/2001	Sevilleta

Table 3. Mexican wolves translocated from captivity or the wild during January 1 – December 31, 2001.

Pack	Wolf	Release Site	Date	Reason for Translocation
Wildcat	AM578, M580, AF624 (pregnant)	Centerfire Creek, AZ	03/17/2001	Stimulate population growth in northern portion of primary zone in Arizona.
Wildcat	AM578	Fish Bench, AZ	11/10/2001	Helicopter capture outside of the BRWRA on the Ladder Ranch, NM; transported into an area with potential female mates
Saddle	m648	Northwest of Big Lake, AZ	05/02/2001	Captured out of the BRWRA on the San Carlos Reservation, AZ; transported into an area with potential female mates
Lupine	m631	Bear Wallow, AZ	07/27/01	Proximity to cattle; possible nuisance behavior; transported into an area with potential female mates and away from cattle

Mortality

Since 1998 there have been 21 wolf mortalities documented, 9 of which occurred in 2001 (Fig. 4). However, this should be considered a minimum estimate of mortalities since pups and uncollared wolves can die and not be documented by project personnel. The majority of mortalities in 2001 were human caused (Table 4), similar to previous years.

The naturally caused death of Lupine AM480 may have led to the break-up of the Lupine pack. Prior to the alpha male's death, 2 yearlings had left the area and after the male's death the rest of the pack dispersed. Five of 6 radio-collared wolves in the Lupine pack died within 6 months of their release and it was assumed the pups did not survive as there were no visuals or sign of them and the alpha female displayed widespread movement patterns prior to her death (Table 4).

Alpha female AF191 of the Pipestem pack also died of natural causes during 2001, significantly affecting her pack. She was not only the breeding female in the pack, but she was also pregnant at the time of her death.

Table 4. Mexican wolf mortalities documented during January 1 – December 31, 2001.

Wolf ID	Pack	Age	Date Found	Cause of Death
AF169	Lupine	7.6	11/12/2001	Illegal Shooting
AF191	Pipestem	6.0	04/23/2001	Mastitis/Toxemia
AM480	Lupine	5.2	07/08/2001	Asphyxiation, Snake Bite
M580	Wildcat (disperser)	2.6	11/10/2001	Capture Complications
m630	Lupine (disperser)	1.6	11/28/2001	Illegal Shooting
m631	Lupine (disperser)	1.4	09/03/2001	Vehicle Collision
f634	Lupine (disperser)	1.6	12/07/2001	Illegal Shooting
f645	Saddle (disperser)	1.5	11/04/2001	Illegal Shooting
fp682	Wildcat	0.1	06/08/2001	Suspected Dehydration

Home Ranges and Movements

Most wolves exhibited normal home range use except for the Lupine pack after the alpha male died, and the Wildcat pack, which was hard released in March. Home ranges were plotted for general reference with a 3-mile buffer as described in the nonessential experimental rule (Fig. 5). Home range sizes were calculated using the 95% convex polygon method and revealed a 10-fold range of sizes from 36 mi² to 368 mi² (Table 5). Known locations of the dispersing wolves were also plotted with a 5-mile buffer using aerial and ground locations (Fig. 6). For reference, territorial packs are also included.

Table 5. Home range sizes of free-ranging Mexican wolves in Arizona and New Mexico.

Pack	No. of Aerial Locations	Home Range Size (mi²)
Hawk's Nest	24	127
Cienega	82	36
Francisco	89	106
Bonito Creek	31	182
Pipestem	127	368
Saddle	70	195
Average	57	169

Wolf Predation

Predator-prey relationships involving Mexican gray wolves have not yet been intensively studied by the project. During 2000 and 2001, a dietary study was conducted by Texas Tech. University, in association with the wolf project. Scat was collected throughout the Primary Wolf Recovery Area for macroscopic and microscopic analysis to determine feeding habits. Laboratory analysis is still ongoing with only preliminary results available. Even though the results are not yet conclusive, the data reveals that wolves are feeding primarily on elk (*Cervus elaphus*). Conservative estimates reveal that 75% of the wolves diet consists of elk, an estimate that is not consistent with predictions made in the Final Environmental Impact Statement (FEIS). Initial predictions assumed that mule deer (*Odocoileus hemionus*) would be the primary prey base of wolves due to their high densities, 3-4 times greater than elk, prior to the inception of the project in 1998. However, due to reasons unrelated to wolves, deer densities within the primary recovery have dropped considerably while elk densities have increased to the point that elk now constitute the primary prey base available to wolves. Elk were also the most commonly documented wolf kills, however the number of carcasses collected was not large enough to produce any statistically significant results.

Wolf Depredation

The FEIS (1996) predicted that there would be 1-34 cattle depredations per year when the Mexican wolf population reaches the reintroduction goal of about 100 wolves. This represents < 0.05% of all cattle present on the range, which is only a fraction of the impact that other predators have on ranching within the Southwest.

During 2001 there were 7 confirmed and 5 possible depredations (Table 6). This is consistent with depredation levels predicted by the FEIS for a wolf population of this size (26 wolves). However, as stated previously, this should only be considered a minimum estimate as some depredations may go undocumented. In 2001 project personnel and USDA-WS captured and translocated 2 wolves into captivity as a result of wolves localizing on private land and their direct association with repeated depredations. DOW paid \$10,594 to livestock producers for losses due to wolves in 2001.

Table 6. Wolf depredations occurring during January 1 – December 31, 2001.

	Confirmed Depredation	Possible Depredation
Fatality	6 calves	1 cow and 3 calves
Injury	1 horse	1 cow

Management Actions

The capturing of wolves is a necessary management action that occurs annually to enhance the project's monitoring capabilities, as well as remove problem animals or wolves that have localized outside of the BRWRA, on private land or on the San Carlos Apache Reservation. These actions are authorized under the Special Rule for the Nonessential Experimental population.

In 2001, there were 7 wolves captured for monitoring purposes, 2 were radio-collared and all animals were processed and released on site. Some wolves were captured multiple times. All wolves were captured by leg-hold traps except for Bonito Creek AF587 who was net-gunned from a helicopter. In addition, there were 5 wolves removed from the population and placed in captivity (Fig. 4), 4 wolves translocated into the A-SNF and 1 wolf that died of capture myopathy during an attempted translocation (Table 7). The wolves that were removed by helicopter captures included AM166, AF592, AF624, AM578, and M580.

Table 7. Mexican wolves captured during January 1 – December 31, 2001.

Pack	Wolf ID	Capture Date	Reason for Capture
Francisco	AM509	07/25/01	Routine monitoring, released on site
Francisco	AM509	08/21/01	Routine monitoring, released on site
Francisco	AF511	07/25/01	Routine monitoring, released on site
Francisco	AF511	09/24/01	Routine monitoring, released on site
Francisco	f644	07/27/01	Routine monitoring, released on site
Saddle	AF510	07/25/01	Routine monitoring, released on site
Saddle	AM574	07/22/01	Routine monitoring, released on site
Saddle	f646	08/17/01	Routine monitoring, released on site
Bonito Creek	AF587	11/10/01	Routine monitoring, helicopter capture, released on site
Saddle	m648	04/30/01	On the SCAR; translocated into the A-SNF
Saddle	m648	05/31/01	Nuisance behavior on the FAIR; returned to captivity
Campbell Blue	AM166	06/10/01	Associated with cattle depredations; outside of BRWRA; helicopter capture; returned to captivity
Campbell Blue	AF592	06/10/01	Associated with cattle depredations; outside of BRWRA; helicopter capture; returned to captivity
Wildcat	AF624	06/10/01	Out of BRWRA; helicopter capture; returned to captivity
Wildcat	mp681	06/10/01	Out of BRWRA; returned to captivity
Lupine	m631	07/26/01	Proximity to cattle; possible nuisance behavior; translocated into A-SNF
Wildcat	AM578	11/09/01	Out of BRWRA; helicopter capture; translocated into A-SNF
Wildcat	M580	11/09/01	On the SCAR; helicopter capture; died as a result of capture
Lupine	m632	12/31/01	Out of BRWRA; feeding on cattle carcasses; translocated into A-SNF (2002)

Outreach

During 2001, project updates were posted locally approximately every 2 weeks in the wolf recovery area (Alpine, Nutrioso, and Springerville) in various places such as the US Post Offices, libraries, US Forest Service offices, and the USFWS Mexican wolf web site. Additionally, project updates were also emailed and faxed to numerous stakeholders and interested citizens.

The Mexican Wolf Interagency Reporting Hotline, 1-888-459-WOLF (9653), was maintained for citizens to report sightings, harassment, taking of Mexican wolves, or livestock depredations.

Project personnel regularly contacted campers, hunters, and other recreationists in the wolf-occupied recovery area to provide information and answer questions about the Mexican wolf project. Direct mailings were sent to 4,100 hunters who drew permits to hunt big game in the Arizona portion of the wolf recovery area. These notices advised hunters of the potential for encountering wolves, provided general recommendations for camping and hunting in wolf-occupied areas, and explained the legal provisions of the nonessential experimental population rule. Project personnel gave 39 presentations and status reports to over 2,080 people in federal and state agencies, conservation groups, rural communities, guide/outfitter organizations, livestock associations, schools, and various other public and private institutions throughout Arizona and New Mexico.

Summary

At the end of 2001, there were 18 radio-collared wolves and approximately 8 uncollared wolves free ranging within the BRWRA. The population includes 6 packs (5 in Arizona and 1 in New Mexico) and 3 dispersing wolves. There could be other undocumented wolves free-ranging whose radio-collars have failed or who were never radio-collared. However, the number of undocumented wolves is probably very small as all credible reports of wolf sightings are investigated and regular field operations has revealed no evidence of extra wolves traveling with established packs. Undocumented wolves are most likely loners, as wolf packs usually leave more sign that is easier to locate.

Since the inception of the project in 1998, there have been 21 wolf mortalities documented in the wild, 9 of which occurred in 2001. Wolves are feeding primarily on elk, which is not consistent with predictions made in the FEIS. However, during 2001 there were also 7 confirmed and 5 possible depredations. This level of depredation is consistent with predictions in the FEIS for a wolf population of this size.

In 2001, there were 7 wolves captured for monitoring purposes, 2 were radio-collared and all animals were processed and released on site. In addition, there were 5 wolves removed from the population and placed in captivity, and 4 wolves translocated into the A-SNF.

Informational direct mailings were sent to 4,100 hunters who drew permits to hunt big game in the Arizona portion of the wolf recovery area. Project personnel provided Bi-weekly updates, maintained a project web site, regularly contacted campers, hunters, and other recreationists, and gave more than 39 presentations and status reports to over 2,080 people in an attempt to keep the public, government agencies, and nongovernmental organizations informed about the program.

Discussion

Overall, progress in the field went as expected and outlined in the FEIS. Packs formed naturally on their own in the wild. Wolves conceived and gave birth to pups in the wild, some surviving through their 1st year. Natural-caused deaths of 2 alpha wolves affected productivity in 1 pack and

completely disrupted another pack. Human caused mortality was significant but did not threaten overall success. However, continued outreach, education, and two-way communication should reduce accidental shootings. Project personnel responded and resolved major conflicts with livestock and nuisance wolves. Responsive management of depredating wolves should reduce the overall amount of depredation and prevent wolves in the future from becoming habituated to livestock. Continuation of existing procedures is recommended.

Mexican Wolf Blue Range Wolf Recovery Area

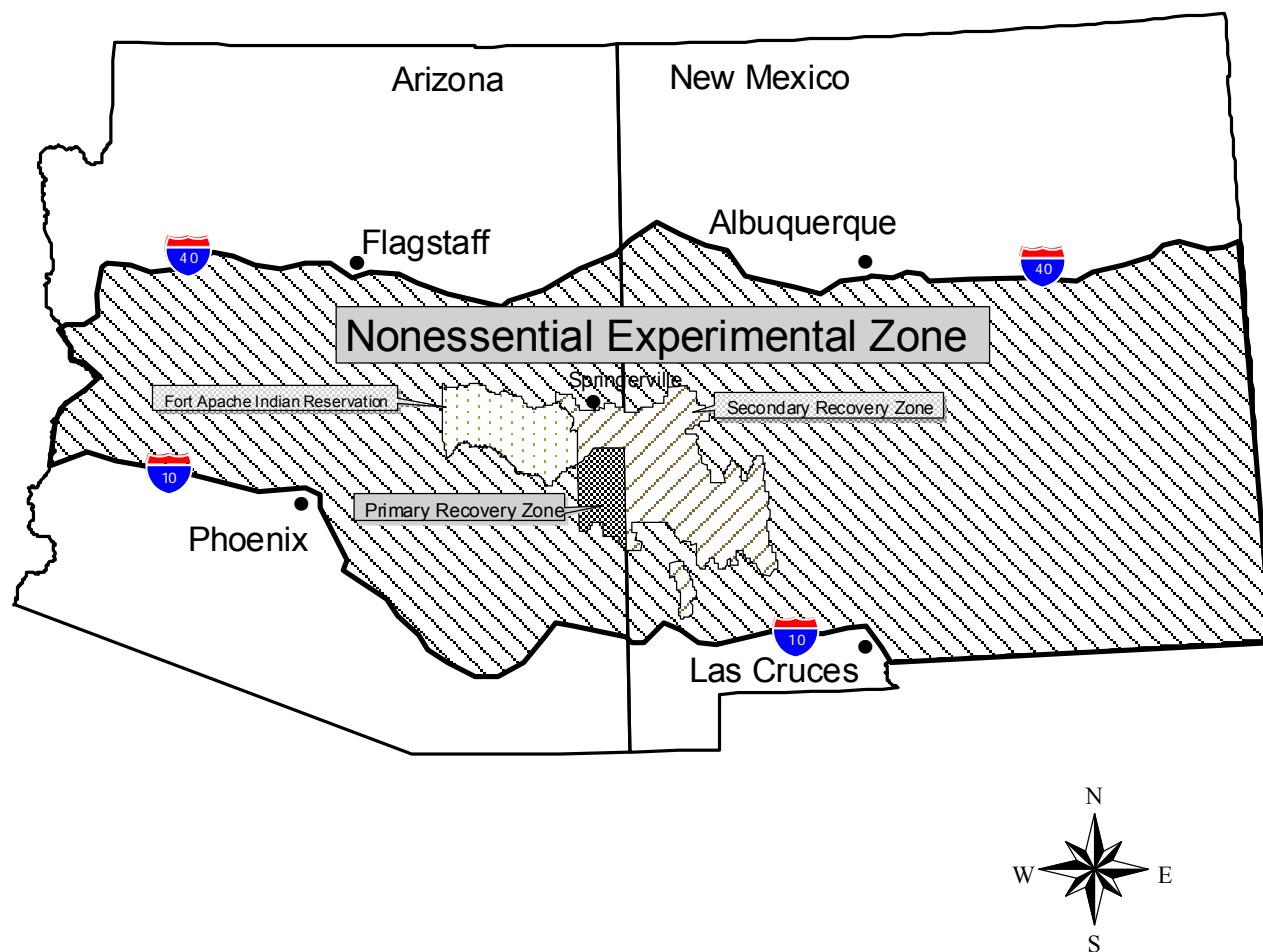


Figure 1. The Mexican Wolf Blue Range Wolf Recovery Area in Arizona and New Mexico.

2001 Release and Translocation Sites

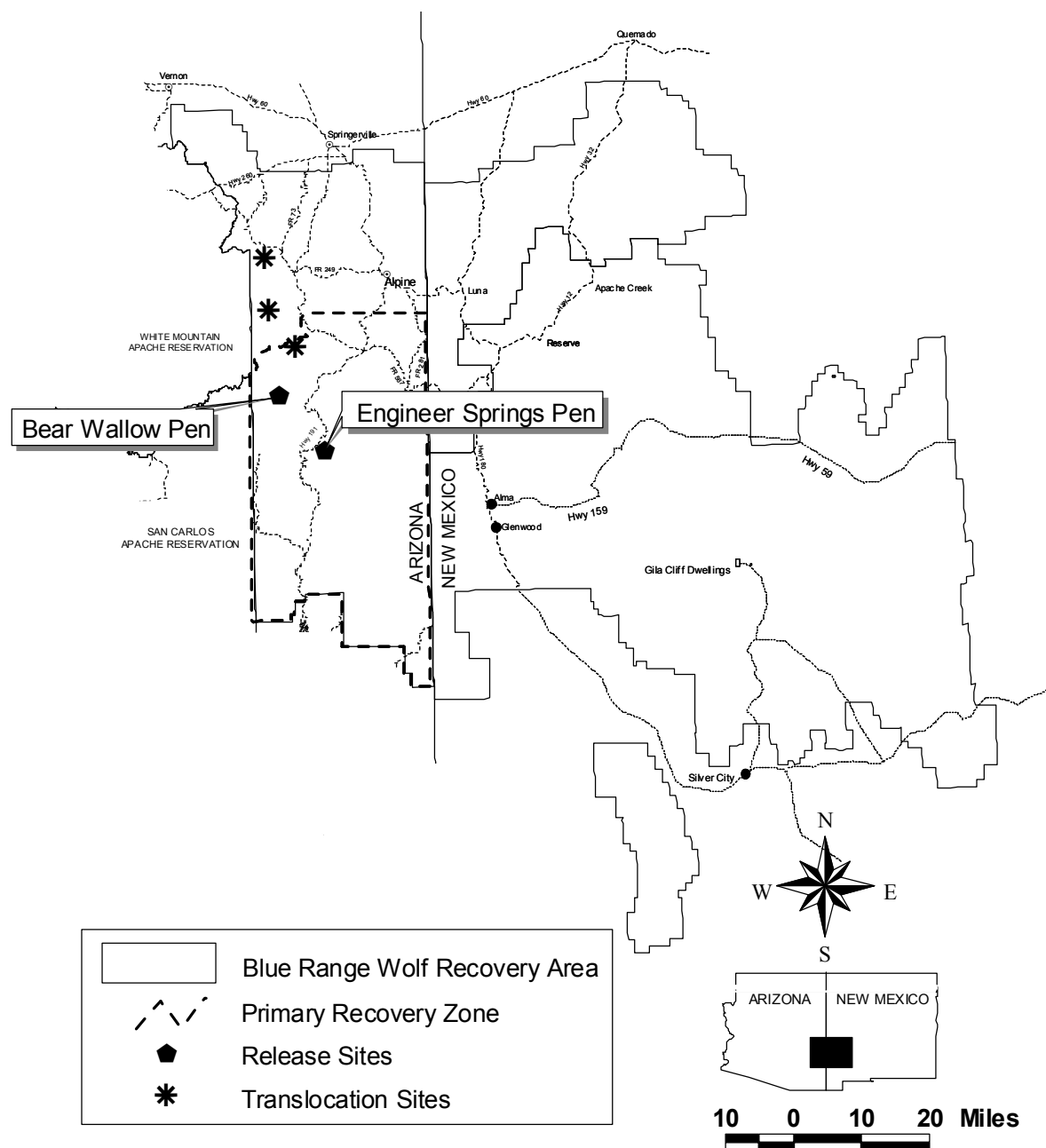


Figure 2. Release and translocation sites for Mexican wolves within the Blue Range Wolf Recovery Area in 2001.

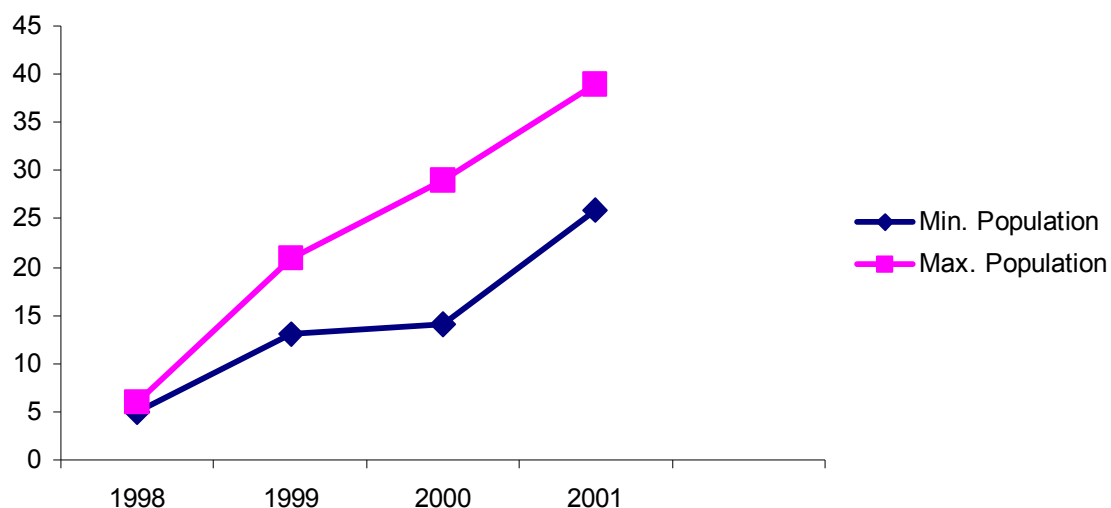


Figure 3. Mexican wolf population estimates from 1998—2001. The difference between the minimum and maximum population represents an estimate of uncollared animals.

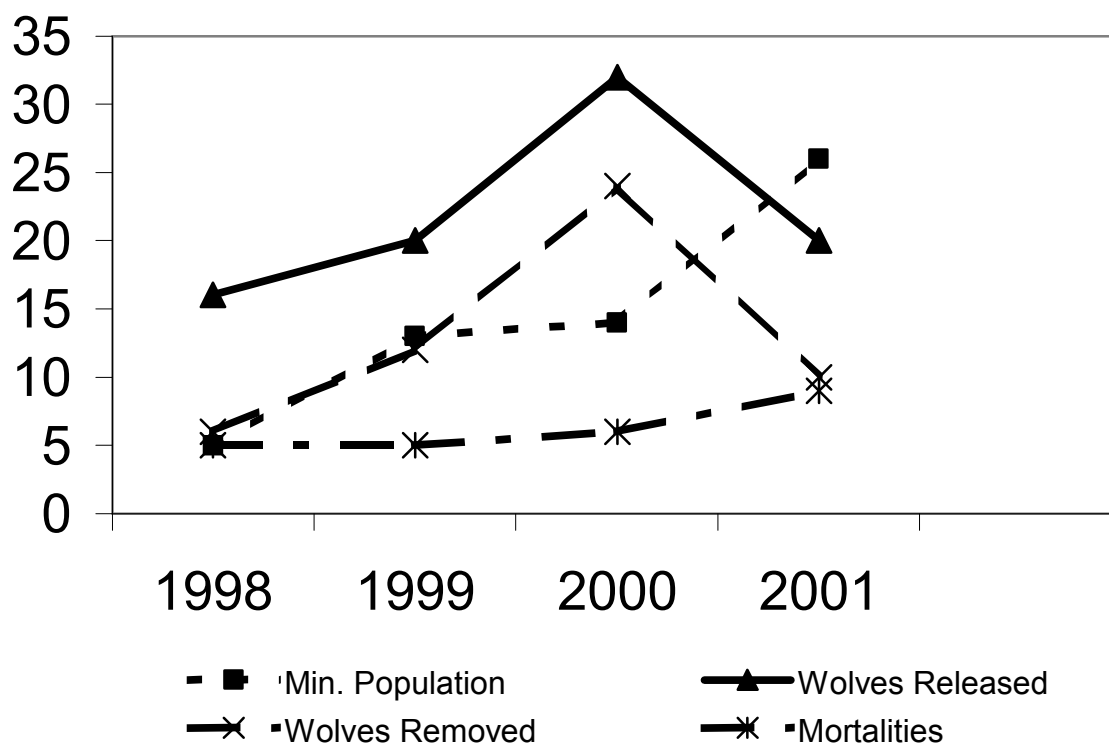


Figure 4. Mexican wolf population estimates and associated population parameters. Released wolves represents: pack translocations (wolves re-released from captivity back into the wild) and initial direct releases (wolves with no wild experience).

2001 Mexican Wolf Home Ranges

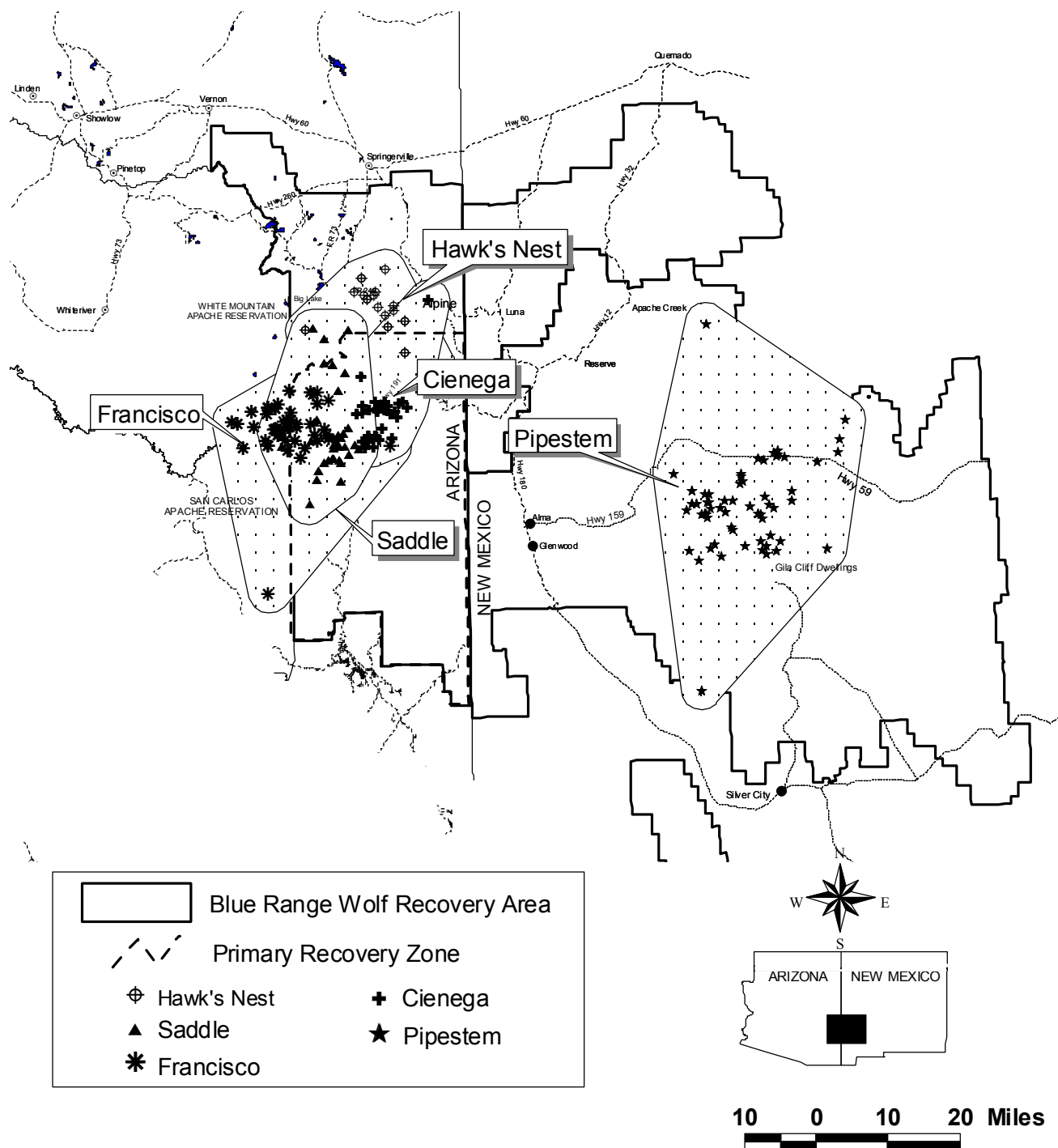


Figure 5. Mexican wolf home ranges in 2001 using the minimum convex polygon method with a 3-mile buffer added.

2001 Mexican Wolf Locations

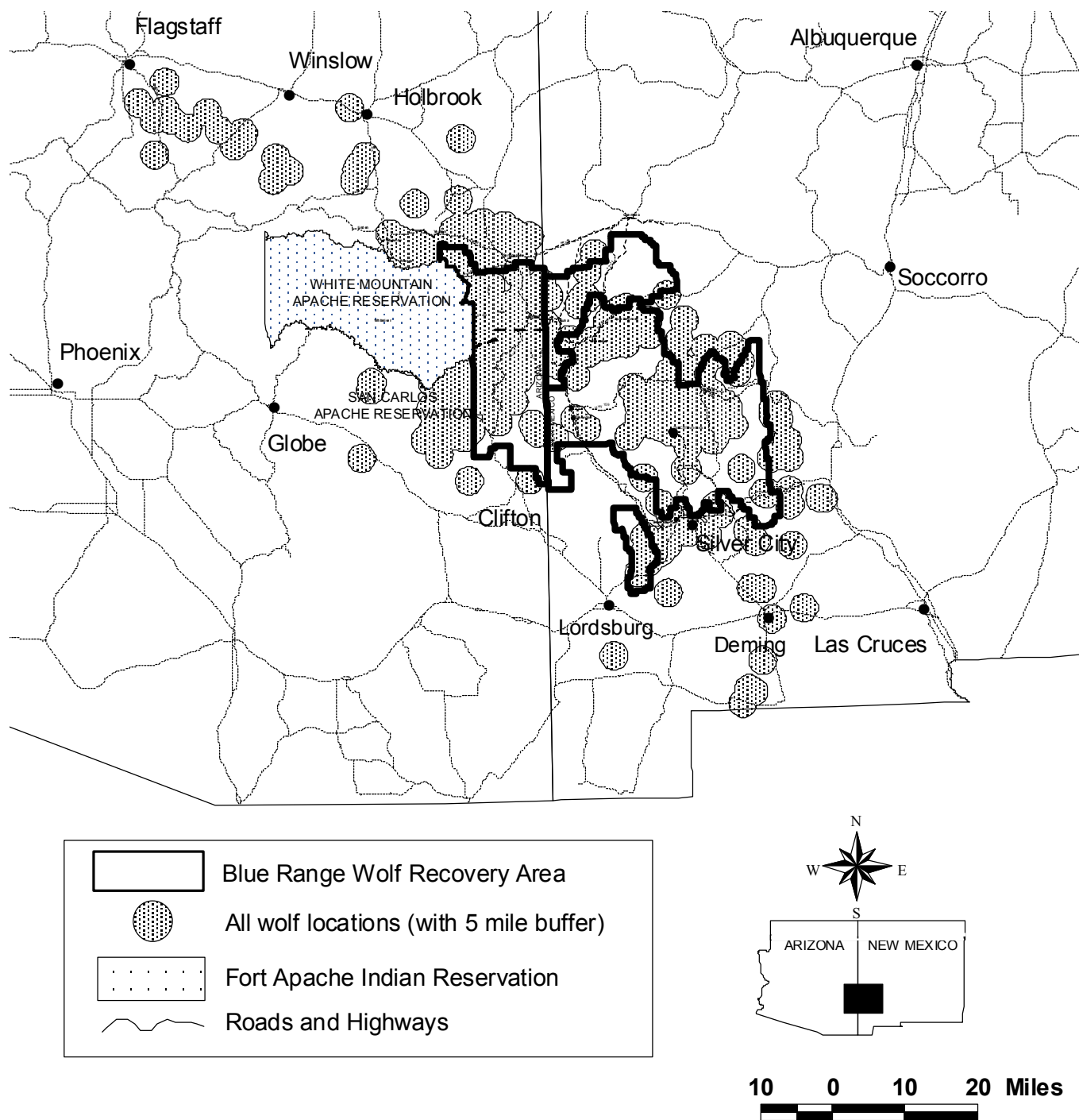


Figure 6. All Mexican wolf locations (aerial and ground) in 2001, with a 5-mile buffer added.

Literature Cited

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APPENDIX A

Pack Summaries

Hawk's Nest (AF486, AM619)

These 2 wolves were first located together in December of 2000. The pair soon established a territory defined by the Campbell Blue River and Williams Valley near Lake Sierra Blanca. This is the same area that AM131 and AF486 had used when they were together in 1999 and 2000 prior to AM131 being euthanized. The female may have denned near Lake Sierra Blanca, but no evidence of pups was documented.

Bonito Creek (AF587, AM674)

After leaving the Hawk's Nest pack in December of 2000, M674 was located regularly with the Francisco pack in January, and in the territory of the Francisco pack through March of that year. In late April of 2001, F587 from the Francisco pack and M674 began to move north and establish a territory south and west of Reservation Lake on the White Mountain Apache Reservation. M674 was the first radio-collared wild-born wolf in the Mexican wolf reintroduction program. This natural pairing is significant because it is the first recorded pack formation from a wild born Mexican wolf.

Cienega (AM194, AF487, F621)

The Cienega pack was able to breed and raise pups in the wild for the first time in 2001. The female denned in an area near Grant Creek east of Hannagan Meadow in the Blue Range Primitive Area (BRPA). In September, IFT members observed two pups with the alpha pair. In October, an elk hunter filmed four wolves, three collared (AM194, AF487, F621) and one un-collared, walking through a meadow. F621 left the alpha pair during the breeding season in January and February and made dispersal movements east and north on three different occasions. Based on aerial telemetry flights, each of the exploratory movements lasted for approximately two weeks. After May 15, F621 traveled with the alpha pair for the remainder of the year.

Saddle (AF510, AM574, f646)

After being released in January of 2001, the pack established a territory in the area south and west of Blue Vista, on the A-SNF. Three of the four yearlings released with the pack dispersed before the end of the year (f645, m647, and m648). AF510 was believed to be denning in April, but no pups were documented to survive. There were also suspected depredations in the East Eagle Allotment where these wolves were located. Several incidents were investigated, but no depredations were confirmed.

Francisco (AM509, AF511, f644)

The Francisco pack spent most of the winter months in the country below the Mogollon Rim, between Baldy Bill Point and Malay Gap. The female denned in the area of Malay Gap. In the early summer the wolves in this pack moved above the rim in the area of the Bear Wallow Wilderness. Monitoring revealed that there were eight wolves in this pack indicating that four pups had survived from 2000 and two pups from 2001. On July 27, f644 was trapped and radio-

collared. The pack continued to use the upper country until late November, before moving back down below the Rim.

Lupine (AF169, AM480, m630, m631, m632, f634, fp678, mp679, mp680)

Soon after their release in 2001, sub-adult members (m630, m631, m632, m634) of the Lupine pack dispersed. The alpha pair was localized near the release site for about the first month. On July 9, AM480 was found dead from asphyxiation induced by snakebite in the Bear Wallow wilderness. AF169 continued to use this area for most of the summer and supplemental feeding continued in order to help support the pups released with the pack. In the fall, AF169 began to expand her movements to the north and west. On November 15, she was found dead from gunshot on the White Mountain Apache Reservation (WMAT). The fates of the pups released with this pack are unknown.

Pipestem Pack (AF191, AM190, F628)

During the winter the Pipestem pack was located between Snow Lake and Black Mountain along the north end of the Gila Wilderness, an area with high elk density. In early January, four sets of tracks were observed indicating that one pup from 2000 was traveling with the collared wolves. This was the last observation or sign of a fourth wolf. On April 25, AF191 was found dead south of Loco Mountain in the Gila Wilderness. The necropsy showed that she died of an infected uterus in association with pregnancy. AM190 and F628 continued to use the Snow Lake to Black Mountain area but made several trips farther south in the Gila Wilderness. In May, the pair was suspected in the depredation of a domestic calf. In June, the pair began using the Cooney Prairie, Canyon Creek Mountain to East Elk Mountain area, slightly north of their previously documented locations. They continued to use this area through the end of the year.

Campbell Blue (AF592, AM166)

The Campbell Blue pair was captured at the request of the San Carlos Apache Tribe in late August of 2000. On December 5, 2000, the pair was hard released in Tom Moore Canyon on the east central side of the Gila Wilderness. In late December, the pair traveled onto private lands within the re-introduction area. AF592 localized in the vicinity of ranch buildings but AM166 moved away. In early January, AM166 left the area and traveled back to his old territory in Arizona. Attempts to re-capture AF592 were unsuccessful and during January, she began making regular long distance movements.

In late April of 2001, AF592 was involved in two domestic calf depredations near Canyon Creek. AM166 returned from Arizona and during late May, reunited with AF592. The pair localized on private lands outside the re-introduction area and began to prey on domestic calves. On June 10, the pair was re-captured and returned to captivity.

Individual Wolf Summaries

AF624

F624 was hard released pregnant in the Centerfire/Boggy Creek area of Arizona on March 17, 2001, with M580 and AM578. The two males were siblings and AM578 was pair-bonded to AF624. In April, AF624 traveled to New Mexico and denned on private land within the reintroduction area. A visit to the den site on June 2 revealed two pups. AF624 then relocated approximately one and a half miles from the former den but still on private land. AF624 was recaptured on June 10, in an attempt to relocate her and her pups to an area with fewer cattle. One pup was found dead and one was severely malnourished and dehydrated. They were returned to captivity for treatment.

AM578

AM578 was hard released in the Centerfire/Boggy Creek area of Arizona on March 17, 2001, with AF624 and M580. Although AM578 appeared to follow AF624 to New Mexico, there is no documentation of them being together. AM578's signal was lost after he moved into New Mexico. In July, he was located south of the re-introduction area near Cooke's Peak, New Mexico. AM578 traveled south, crossing Interstate 10 and continued to the US – Mexico border near Columbus, New Mexico. Attempts were made to trap him on several occasions outside the experimental population boundary. This wolf then traveled north and localized in the vicinity of the Phelps Dodge Tyrone Copper Mine. At the request of the Phelps Dodge Company, attempts were made to capture AM578. He then traveled south towards Lordsburg, New Mexico then moved east to Rio Grande Valley. On November 9, AM578 was captured on private land and was relocated to Arizona northeast of Hannagan Meadow. He then traveled northeast towards Apache Creek, New Mexico.

M580

M580 was hard released in the Centerfire/Boggy Creek area of Arizona on March 17, 2001, with AF624 and AM578. M580 appeared to make movements in the general area of the release site, as well as, forays onto the San Carlos and White Mountain reservations, for several months after the initial release. He continued to range widely across the recovery area in a manner consistent of a lone wolf until November; upon the request of the San Carlos Apache Tribe, an attempt was made to remove M580 from tribal land. Although he was captured and removed with a helicopter on November 9, 2001, M580 died the next day due to capture myopathy.

m630

m630 was released as a yearling on June 20, 2001, with the Lupine Pack in the Bear Wallow Wilderness of Arizona. He dispersed north through the BRWRA. On December 3, m630 was found dead from a gunshot north of Greens Peak in Arizona.

m631

m631 was released as a yearling on June 20, 2001, with the Lupine Pack in the Bear Wallow Wilderness of Arizona. He dispersed to New Mexico and was captured near Apache Creek, New Mexico; he was released back in the Bear Wallow Wilderness in the A-SNF. He returned to the area near Apache Creek and was found dead on September 4, from a vehicle collision.

m632

m632 was released as a yearling on June 20, 2001, with the Lupine Pack in the Bear Wallow Wilderness of Arizona. He dispersed north and east and was located on private land outside the BRWRA feeding on dead livestock. At the request of the landowner, m632 was captured on December 31, near the San Augustine Plains, in New Mexico. He was transferred to the Engineer Springs release pen and held there until his release in January, 2002.

f634

f634 was released as a yearling on June 20, 2001, with the Lupine Pack in the Bear Wallow Wilderness of Arizona. She dispersed to the northwest and disappeared. She was found dead on December 7, 2001, from a gunshot near Woods Canyon Lake, in Arizona. She had been dead for several months.

f645

f645 was originally released as a member of the Saddle pack in Arizona on January 11, 2001. However, in March, f645 and two siblings (m647, m648) moved away from the pack onto San Carlos Tribal land. f645 returned to the Saddle pack, while her two siblings dispersed (see below). In early July, f645 moved into the area south of Highway 260 on the White Mountain Apache Reservation. However, she eventually rejoined the Saddle pack one month later. f645 continued with this nomadic behavior in early October when she moved into the Greens Peak area. She remained in this area until November 5, 2001, when she was found dead from a gunshot.

m647

m647 was originally released as a member of the Saddle pack in Arizona on January 11, 2001. However, in March, m647 and 2 siblings (f645, m648) moved away from the pack onto San Carlos Tribal land. m647 dispersed north onto the White Mountain Apache Reservation and eventually moved north towards Highway 260. He then moved several miles north of Springerville, followed by dispersal into an area near Vernon, where he remained until July, 2001. His movements in July are not known. m647 was documented again in August northwest of Snowflake, Arizona around Chevelon Lake. In October, m647 moved to the east and spent time in the area around Mormon Lake. Near the end of the reporting period he moved back towards Show Low, near Wishbone Mountain.

m648

m648 was originally released as a member of the Saddle pack in Arizona on January 11, 2001. However, in March, m648 and 2 siblings (f645, m647) moved away from the pack onto San Carlos Tribal land. Although the other wolves eventually left the San Carlos Apache Reservation (SCAR), m648 remained in the area and was removed on May 2 and relocated to the Big Lake area, in Arizona. Nuisance behavior by this wolf was documented resulting in his capture on May 31, 2001; he was returned to captivity.

APPENDIX B

Captive Management

The captive Mexican gray wolf population is managed for the Service under the American Zoological and Aquarium Association's Mexican Wolf Species Survival Plan program (SSP). In 2001, there were approximately 205 wolves in captivity in over 40 facilities in the United States and Mexico. One of the primary goals of the SSP captive breeding program is to provide wolves for the Service for reintroduction purposes. Captive wolves are selected for release based on their genetic makeup, reproductive performance, behavioral criteria, physical suitability, and response to the adaptation process. All wolves selected for release are genetically redundant to the captive population (i.e. their genes are already well-represented) to minimize any adverse effects on genetic integrity of the remaining captive population, in case they expire in the wild.

Release candidate Mexican gray wolves are acclimated prior to release in Service-approved facilities designed to house wolves in a manner that fosters wild characteristics and behaviors. They include the Sevilleta Wolf Management Facility, the Ladder Ranch Wolf Management Facility, and Wolf Haven International (described below). Wolves at these facilities are managed in a manner that minimizes human contact in order to promote the development of wolf behaviors such as pair bonding, breeding, pup rearing, and pack structure development. More importantly, limiting the wolves' exposure to humans also serves to promote avoidance behavior.

Release candidate Mexican gray wolves are sustained on a zoo-based diet of carnivore logs and a kibble diet formulized for wild canids. Additionally, carcasses of road-killed native ungulate species, such as deer and elk, are supplemented when available to mimic prey items the wolves would encounter in the wild. Wolves held at pre-release facilities are examined annually to vaccinate for canine diseases and to evaluate overall health conditions, and are treated for other veterinary purposes on an as-needed basis.

Sevilleta Wolf Management Facility (SWMF)

The SWMF is located on the Sevilleta National Wildlife Refuge near Socorro, New Mexico. There are a total of seven enclosures, ranging in size from $\frac{1}{4}$ of an acre to approximately $1\frac{1}{4}$ acre, plus an additional quarantine pen.

Ladder Ranch Wolf Management Facility (LRWMF)

The LRWMF is located on the Ladder Ranch near Truth or Consequences, New Mexico. There are a total of five enclosures, ranging in size from $\frac{1}{4}$ acre to 1 acre.

Wolf Haven International (WHI)

WHI is located in Tenino, Washington. There are a total of two enclosures at the facility for housing Mexican wolves, each just over $\frac{1}{2}$ acre in size.

APPENDIX C

Personnel

The following personnel were involved in the project during this reporting period. Individuals listed below collected data or provided other information for this report.

U.S. Fish and Wildlife Service

Brian Kelly, Mexican Wolf Recovery Coordinator
Wendy Brown, Mexican Wolf Field Coordinator (until May 2001)
Colleen Buchanan, Mexican Wolf Captive Management Biologist
Dan Stark, Mexican Wolf Biologist
Maggie Dwire, Biological Technician (Apr-May 2001); Mexican Wolf Biologist (Nov 2001)

Michelle Brown, Outreach Coordinator (until September, 2001)
Theresa Oleksiew, Office Assistant
Vanessa Sanchez, Student Cooperative Education Program

Arizona Game and Fish Department

Dan Groebner, Regional Nongame Specialist and AGDF Wolf Project Leader
Stephanie Naftal, Field Team Leader (until Nov 2001)
Alexis Watts, Wolf Technician (until Sep 2001)
Paul Overy, Wolf Technician (after Aug 2001)

New Mexico Department of Game and Fish

Nick Smith, Wolf Biologist

USDA-APHIS Wildlife Services

Alan Armistead, Wolf Management Specialist

Turner Endangered Species Fund

Melissa Woolf, Mexican Wolf Biologist

White Mountain Apache Tribe

Krista Beazley, Tribal Mexican Wolf Biologist (after Mar 2001)

Texas Tech. University

Janet Reid, Master's Student (Dietary Study)

Volunteers

Rich Bard	Brandon Barr	Melany Benoit	Anna Cellar
Cari Common	Maggie Dwire	Tamar Friedner	Jason Hawley
Ryan Hilgris	Grant Merrill	Julia Nelson	Melissa Peer